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Reclamation

Federal irrigation projects

Washington

1925

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U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

FEDERAL
IRRIGATION PROJECTS

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IRRIGATING SUGAR BEETS ON THE MINIDOKA PROJECT, IDAHO

1924
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U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

FEDERAL
IRRIGATION PROJECTS

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Box 183



IRRIGATING SUGAR BEETS ON THE MINIDOKA PROJECT, IDAHO



The desert



The desert reclaimed

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FEDERAL IRRIGATION PROJECTS

THIS booklet is published to give information to inquirers generally regarding the irrigation projects of the Bureau of Reclamation. Further information may be obtained from the Bureau of Reclamation, Washington, D. C., and Denver, Colo., or by addressing project superintendents, a list of whom, with their addresses, is given on page 10.

THE RECLAMATION ACT AND ITS ACCOMPLISHMENTS

The reclamation act was approved June 17, 1902. Congress passed this act in order that large areas of lands suitable for irrigation farming in the arid States might provide homes for citizens, increase the agricultural area of the country, and make beneficial use of two of its national assets, land and water.

Need for reclamation.—The early pioneer could with a team and plow and a few days' work divert the water from small streams to the bottom lands and produce good crops by irrigation. Within a short period of time these streams were fringed with farms and the development of water for irrigation became more difficult and costly. Lands adjacent to the developed areas were often on higher benches and were equal or sometimes better in quality than the lower-lying areas. Such lands could be irrigated only by the construction of diversion dams, storage works, and large canal systems. Such works, constructed by the United States Government, together with the lands served with water, all located in a more or less compact area, are known as Federal irrigation projects.

Existing projects.—There are 25 such projects, located in whole or in part in 15 of the arid States. On June 30, 1924, 22 years after the passage of the reclamation act, a volume of water had been impounded in reservoirs or diverted from regular stream channels sufficiently large to irrigate 1,718,400 acres of project lands and to furnish supplemental irrigation under the Warren Act of February 2, 1911, to 1,231,400 acres of land having an insufficient water right for full crop production. Of the 1,718,400 acres mentioned 1,213,700 acres were irrigated, and of this irrigated area 1,179,870 acres were cropped during the season of 1923. The average acre value of the crops produced during 1923 was \$55, or a total crop value for all the projects of more than \$65,000,000.

This represents more than one-third of the total cost of construction on all the reclamation projects. During the existence of the Bureau of Reclamation more than \$575,000,000 worth of crops have been produced on the projects, not including the value of crops produced on lands which receive supplemental irrigation water. The lands on the projects, brought under irrigation by the efforts of the bureau, have been divided into 35,000 farms on which live 127,500 individuals. In addition there are 206 towns and cities on or adjacent to the projects, with a population of 338,000, a considerable part of which derive their support indirectly from the activities of these projects. There are also on the projects 609 schools, 621 churches, 157 banks, and a great variety of manufacturing enterprises which make use of the products of the projects.

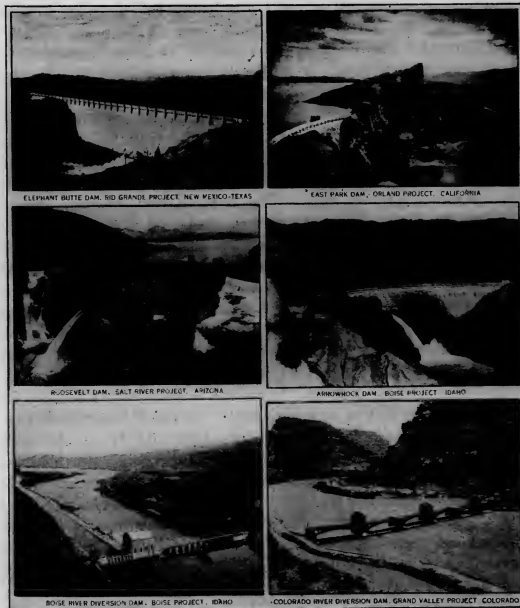
ENGINEERING WORKS

Monumental engineering works to supply these projects with water have been constructed with great skill. Some of the structures are famous throughout the world; some of the most important are illustrated and described herein.

Roosevelt Dam.—The Roosevelt Reservoir is formed by a dam in the Salt River Canyon just below the mouth of Tonto Creek. This reservoir supplies water for the Salt River project, Arizona. Power amounting to 11,750 k. v. a. is also produced with the water which is stored in the reservoir. The reservoir covers an area of 18,100 acres and has a capacity of 1,635,000 acre-feet. The spillway is 420 feet long and will pass 150,000 second-feet of water. The dam is a gravity structure, arched in plan, of rubble masonry with coarse rubble faces laid in Portland cement mortar and vertical joints filled with concrete. The principal dimensions are as follows: Height, 280 feet; base width, 158 feet; least width near top, 16 feet; top length, 1,125 feet; arch radius at center line at top, 410 feet. The dam contains 342,325 cubic yards of masonry and has a 16-foot roadway along the top and a spillway at each end. In the construction of the dam a cement factory was installed near the site and all the cement used was manufactured on the ground. Construction was begun in May, 1905, and completed February 5, 1911. The formal dedication, at which President Roosevelt was present, took place on March 18, 1911. The total cost of the dam, including spillways and outlet valves, was \$3,923,250.

Arrowrock Dam.—The Arrowrock Dam, which forms the Arrowrock Reservoir, is located on the Boise River, about 22 miles in a northeasterly direction from Boise, Idaho, and supplies water to the Boise project. The area of the reservoir is 2,860 acres and the capacity 280,000 acre-feet. The length of the spillway is 402 feet,

which is constructed to pass 40,000 second-feet of water during floods. This dam is a concrete gravity section arched structure of the following principal dimensions: Height, 349 feet; base width, 223 feet; least width near top, 16 feet; crest length, 1,100 feet; arch radius at top, 672.5 feet. It contains 585,000 cubic yards of concrete. There is a 16-foot roadway across the top of the dam. Construction was begun in the spring of 1911 and completed in November, 1915. The outflow from the reservoir is controlled by two sets of ten 58-inch balanced valves, which discharge water through the dam at elevations 100 and 187 feet, respectively, below the spillway crest. In connection with the construction of this dam 17 miles of railroad were built, connecting the nearest point of the Oregon Short Line with the work. The cost of the dam complete, including the spillway and outlet valves, was \$4,232,382.



Representative storage and diversion dams

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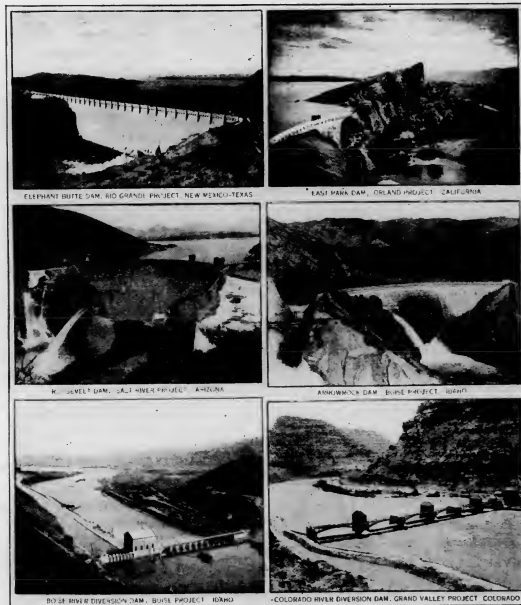
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Representative storage and diversion dams

Elephant Butte Dam.—The Elephant Butte Reservoir, which is formed by the dam of the same name, is located on the Rio Grande 120 miles northwest of El Paso, Tex., and supplies water to the Rio Grande project. The area of the reservoir is 40,080 acres; capacity, 2,638,000 acre-feet. The spillway, which is 275 feet long, will pass during flood times 16,000 second-feet of water. The dam is a straight structure of the gravity type, built of rubble concrete, and has the following dimensions: Height, 306 feet; base width, 154 feet; least width near top, 18 feet; crest length, 1,675 feet, including spillway and approaches. It contains 605,200 cubic yards of masonry. The construction of the dam was approved by the Secretary of the Interior on May 23, 1910, and the structure was completed May 13, 1916. The cost of the dam, including spillways and outlet valves, was \$4,536,523.

East Park Dam.—The East Park Dam, which forms the East Park Reservoir, is located across Little Stony Creek, about 40 miles southwest of Orland, Calif., and supplies irrigation water to the Orland project. The area of the reservoir is 1,850 acres and the capacity 51,000 acre-feet. A spillway 415 feet long is provided, which will pass 12,000 second-feet during flood. The dam has a gravity section, built on the plan of an arch, and is built of concrete. The height of the dam is 139 feet; the crest length 250 feet, and the dam contains 12,200 cubic yards. Construction was begun in August, 1908, and completed in July, 1910, at a cost of \$196,243.

Boise River diversion dam.—The Boise River diversion dam is located on the Boise River, 8 miles southeast of Boise, Idaho, and was constructed for the diversion of the waters of the Boise River to the main canal, which has a capacity of 2,500 second-feet. This dam is built of rubble concrete masonry, founded on compact gravel, and is 45 feet high above the river bed and 246 feet long at the crest. The volume of the dam is 21,750 cubic yards. Besides diversion of irrigation water, power to the extent of 1,875 k. v. a. is developed. Work was begun on February 21, 1906, and completed during October, 1908, at a cost of \$362,182. This dam is built with a logway for passing 60,000,000 feet of saw logs down the Boise River each year.

Colorado River diversion dam.—The Colorado River diversion dam is located on the Colorado River about 8 miles northeast of Palisade, Colo., and diverts water into the high-line canal of the Grand Valley project for the irrigation of land on the Grand Valley and Orchard Mesa projects. The height of the dam is 24 feet and the length 546 feet. It consists of a solid concrete weir resting on a gravel foundation surrounded by eight massive piers and provided with seven roller crests for regulating the height of the backwater at the intake of the canal. Six of these roller crests span openings 70 feet in length and are 10 feet 3 inches in diameter. The seventh

roller is 60 feet long and 15 feet 4 inches in diameter, and regulates the flow of water through the spillway in front of the canal intake. The adoption of this movable crest was necessary in order to avoid raising the height of the backwater during flood periods to such elevation as would interfere with the tracks of the Denver & Rio Grande Railroad. The volume of the dam is 25,680 cubic yards and the cost was \$495,466. Work was begun on August 25, 1913, and completed in 1915. This roller-crest dam was the first large construction of its kind undertaken in this country, although similar construction had been practiced in Germany for some time. The contract for the manufacture of the rollers was made with the German patentees, but on account of the war this had to be cancelled and the rollers were redesigned and manufactured in the United States.

Many thousands of miles of canals and laterals have been constructed, as well as roads, railroads, telephone and power lines, flumes, and pipe lines. The power plants maintained develop 64,159 horsepower. As drainage is always incidental to irrigation, more than 2,000 miles of open and closed drains have been constructed to prevent the water-logging of 586,650 acres of land.

FINANCING THE CONSTRUCTION OF PROJECTS

The reclamation act of 1902 provided that the funds obtained from the sale of public lands in 16 of the arid Western States should be used by the Secretary of the Interior for the examination and construction of Federal reclamation projects. Soon after the act became operative projects were selected and construction work began. The construction program adopted soon required all the funds made available by the act and an additional sum of \$20,000,000 was needed, which was provided for by a loan from the United States Treasury under the act of June 25, 1910. This loan is being repaid at the rate of \$1,000,000 a year under the act of June 12, 1917. Additional funds were made available by the mineral leasing act of February 25, 1920, and the reclamation fund was further supplemented from time to time by special acts in which funds were provided for special purposes. One of the greatest sources of revenue is the collection of repayments from water users on account of construction, operation and maintenance, and water-rental charges.

DETERMINATION OF PROJECT COSTS AND THE ISSUANCE OF PUBLIC NOTICES

Heretofore, when the project works were completed and the cost thereof determined, the per acre cost, as charged against the irrigable acreage of the project, was announced as a construction charge by a public notice issued by the Secretary of the Interior, which gave

the terms and conditions upon which public lands might be entered or water-right applications accepted for lands in private ownership. As projects are frequently separated into divisions, the cost was charged against each division in accordance with the works which served it. Therefore the acreage cost of construction was not always the same for all farm units on a project.

After public notice was issued determining the acre cost of construction, the water users frequently requested that additional construction work be done by the bureau to make the irrigation system operate more efficiently or to provide needed improvements. In such cases the water users expressed themselves by signing individual agreements under section 4 of the act of August 13, 1914, and when such agreements were accepted by an order of the Secretary of the Interior the additional works were constructed, the cost thereof to be paid by the water users in accordance with their agreements as supplemental construction charges in addition to the original construction charge.

Under the act of December 5, 1924, two public notices relating to the construction charge are to be issued—the first notice when the land is ready for settlement, which will announce the construction charge; the second notice when, in the opinion of the Secretary of the Interior, the agricultural development of the project, or a division thereof, shall have advanced sufficiently to warrant the commencement of payment of installments of the construction charge. This latter notice will fix the date when payments shall begin on the charge as announced by the first notice, which date shall not be later than five years from the date of the first notice.

REPAYMENT OF CONSTRUCTION COST

Without interest.—The reclamation act and amendments thereto provide that those who settle upon the reclaimed lands shall be required to repay in installments and without interest the money which has been expended in the construction of the works necessary to make water available to the farmer.

Ten-year act.—The reclamation act of June 17, 1902, provides that the construction cost shall be repaid in equal annual installments, not exceeding 10, beginning with the date specified in the public notice. Most of the contracts under this repayment plan have paid out or have been changed to the 20-year plan.

Twenty-year act.—The extension act of August 13, 1914, provides that construction charges shall be repaid in 20 years, but there is a distinction between lands previously made subject to the reclamation act of June 17, 1902, and lands not subject to that act, as follows:

Section 1 applies to lands which were not subject to the conditions of the reclamation act prior to August 13, 1914, and provides

that the construction charge per acre shall be paid by an initial installment of 5 per cent, due at the time application for entry is filed, and the balance in 15 annual installments, the first 5 of which shall each be 5 per cent and the remainder shall each be 7 per cent, until the whole amount shall have been paid. The first of the annual installments shall become due and payable on December 1 of the fifth calendar year after the initial installment, and the remaining installments shall become due and payable on December 1 of each year thereafter.

Section 2 applies to lands which were subject to the terms and conditions of the reclamation act prior to August 13, 1914, and provides that 2 per cent of the construction charge shall be paid each of the first 4 years, 4 per cent each of the next 2 years, and 6 per cent each of the following 14 years. The first of the annual installments became due and payable on December 1 of the year in which the benefits of the extension act were formally accepted by the water users, and the remaining installments became due and payable on December 1 of each year thereafter.

There are a great many contracts in force under the extension act.

Payment on crop production basis.—The act of December 5, 1924, provides for payment of the construction charge at the rate of 5 per cent of the average gross annual acre income for the 10 calendar years first preceding, or for all years of record if fewer than 10 years are available, of the area in cultivation in the project, or a division thereof, in which the land is located, as found annually by the Secretary of the Interior. This plan is based on the productive capacity of the land. The Secretary of the Interior is authorized to fix different construction charges against different classes of land under the same project, or a division thereof, for the purpose of equitably apportioning the construction cost so that all lands may bear the burden of such cost according to their productive value. Project lands will be classified and each farm will be put in a definite class based on its productive capacity. This does not mean, however, that a farmer will be required to pay on his actual recorded annual crop return for his particular farm, but rather on the average crop return for the irrigable area of the class to which his farm belongs.

Temporary water service.—Where public notice has not been issued announcing the construction charge per acre, but an order has been issued making public land available for entry, the settler pays for water on an annual rental basis. Payment of the construction charge, in that event, does not commence until public notice is issued providing for it. There are several projects, or divisions of projects, which are subject to this condition.

WARREN ACT LANDS

It was found on some projects that a surplus of water had been developed over and above that needed by the lands of the project, which could be used to augment the supply for partially irrigated lands under private systems. Consequently the act of February 21, 1911, was passed. This act provides that such surplus waters may be sold to adjacent and near-by lands, and also that the United States may cooperate with others in the construction and operation of dams and reservoirs which may be used to supply project lands and lands of the cooperating parties. Warren Act contracts have been made with irrigation districts, water users' associations, corporations, and individuals, but the terms of repayment are not the same in all the various contracts.

OPERATION AND MAINTENANCE

By Bureau of Reclamation.—The water used for irrigation requires careful and proper distribution to the farmers. The distribution of water causes the annual operation cost. The structures and canal systems built by the bureau represent a large outlay of money, but a greater value in the service they render to the farmers who must utilize them. These structures and canals must be cared for in the best possible manner. Expenditures for such purposes are known as the annual maintenance cost. The operation and maintenance costs, or O. & M. costs, are usually grouped together because the services overlap and the same organization looks after both. The charges to repay the O. & M. cost are payable yearly by the farmers and vary from year to year on each project, depending upon the amount of work done and the problems encountered. The charges have in the past been due and payable after the close of the irrigation season, but in the future they will be due and payable in advance, at or before the beginning of the irrigation season, as announced by the Secretary of the Interior.

By water users.—The farmers on the projects are organized into water users' associations or irrigation districts, and they elect their governing boards. It is the policy of the bureau to turn over the operation and maintenance of the projects to the farmers as soon as possible. On some projects this has already been done. Where it has not, a small assessment is levied to support a water users' association or a small tax is levied to support an irrigation district. These assessments, though small, must be paid in addition to the regular operation and maintenance charges.

HOW TO ACQUIRE LAND

The public notices previously referred to are issued by the Secretary of the Interior and give a list of the lands for which water is available.

Public land.—The applicant for public land shall be eligible to become an entryman under the homestead laws of the United States and prepared to conform to the rules and regulations of the Bureau of Reclamation. On some projects the construction charges have been announced; on others they have not. The title to public land remains in the United States until patent is issued, although the law permits assignment prior to issuance of patent; therefore public land may be acquired either by entry or assignment. The applicant should obtain definite information from the project superintendent in respect to units available and the conditions under which entry may be made. Water-right application forms, when required, will be supplied from the various projects upon request. Application forms for homestead entry may be obtained from the local land office. The act of December 5, 1924, provides that the Secretary of the Interior is authorized to require of each applicant, including preference right ex-service men, for entry to public lands on a project, such qualifications as to industry, experience, character, and capital as in his opinion are necessary to give reasonable assurance of success by the prospective settler.

Privately owned land.—Privately owned land can be purchased in the various projects and is obtained similarly to purchasing such land elsewhere, except that purchasers must comply with the rules and regulations of the Bureau of Reclamation, particularly in regard to the payment of construction and operation and maintenance charges heretofore mentioned. Privately owned land located within the project boundaries may or may not be subject to the reclamation law, depending on whether the land is covered by water-right application or by subscription for stock in a water users' association or is included in an irrigation district which has contracted with the United States. Inquiry at the project office will ascertain these facts.

ADDITIONAL INFORMATION

The available public lands and the opportunities for the purchase of privately owned land are continually changing on the projects. The Bureau of Reclamation issues information regarding these conditions to those requesting it. The project superintendents can furnish detailed information in regard to opportunities for settlers on

their projects, and they should be addressed as given hereunder to obtain such information:

State	Project	Name	Address
Arizona.....	Salt River.....	General superintendent and chief engineer, Salt River Valley Water Users' Association.	Phoenix, Ariz.
Arizona-California.....	Yuma.....	Project superintendent, Bureau of Reclamation.	Yuma, Ariz.
California.....	Orland.....	do.....	Orland, Calif.
Colorado.....	Grand Valley.....	do.....	Grand Junction, Colo.
Do.....	Uncompahgre.....	do.....	Montrose, Colo.
Idaho.....	Boise.....	do.....	Boise, Idaho.
Do.....	King Hill.....	do.....	King Hill, Idaho.
Do.....	Minidoka.....	do.....	Burley, Idaho.
Montana.....	Huntley.....	do.....	Ballantine, Mont.
Do.....	Milk River.....	do.....	Malta, Mont.
Do.....	Sun River.....	do.....	Fairfield, Mont.
Montana-North Dakota.....	Lower Yellowstone.....	do.....	Savage, Mont.
Nebraska-Wyoming.....	North Platte.....	do.....	Mitchell, Nebr.
Nevada.....	Newlands.....	do.....	Fallon, Nev.
New Mexico.....	Carlsbad.....	do.....	Carlsbad, N. Mex.
New Mexico-Texas.....	Rio Grande.....	do.....	El Paso, Tex.
Oregon.....	Umatilla.....	do.....	Hermiston, Oreg.
Oregon-California.....	Klamath.....	do.....	Klamath Falls, Oreg.
South Dakota.....	Belle Fourche.....	do.....	Newell, S. Dak.
Utah.....	Strawberry Valley.....	do.....	Provo, Utah.
Washington.....	Okanogan.....	do.....	Okanogan, Wash.
Do.....	Yakima.....	do.....	Yakima, Wash.
Wyoming.....	Riverton.....	do.....	Riverton, Wyo.
Do.....	Shoshone.....	do.....	Powell, Wyo.

OPPORTUNITIES FOR SETTLERS

The use of interest-free capital.—In considering the purchase of farm lands on a reclamation project the fact that the repayment period to return the acre cost of water covers many years (under the act of August 13, 1914, twenty years, and under the act of December 5, 1924, on the basis of 5 per cent of the gross acre annual income, both plans being previously explained herein), and that during the period of repayment there are no interest charges except against overdue payments, it must be realized that these conditions are of benefit to the farmers settling upon them.

Variety of climatic and soil conditions.—The projects, located in 15 of the 17 Western States, represent a great variety of climatic conditions, as, for example, Salt River, Ariz., and Lower Yellowstone, Mont. There are also great differences in elevation. Grand

Valley, for example in Colorado, has an elevation of 4,700 feet, and Yuma, in Arizona, 110 feet. Likewise there is a great variation in soil conditions between the various projects, and even between farms on a project. These factors of soil and climate determine the kind of crops that can be profitably grown. These conditions vary so widely that the southern projects produce cotton, citrus fruits, and other semitropical plants, whereas on the more northern projects harder crops, such as sugar beets, alfalfa, grains, apples, and potatoes, are the chief products.

Settler should choose.—Settlers should determine, if possible, the kind of agriculture they desire to follow and to which their experience and capital are best suited, as well as the climatic conditions most suitable to their well-being. The most satisfactory way to determine these things is to inspect the land before making a selection or purchase and spend enough time in a community to determine if the farm under consideration offers a satisfactory opportunity for the economic and social growth of the family. The employees of the Bureau of Reclamation may be relied upon to give courteous treatment and wholesome advice to intending settlers. Detailed information as to climate, crops, schools, churches, transportation, and towns is given for each project in the succeeding pages of this booklet.

Capital required.—The capital a settler should have to purchase either raw or developed land is difficult to state. There are many conditions which enter into the question. Much depends on the condition of the land when selected or purchased and the time and expense required to bring the farm into production. If the land is rough it will have to be leveled. Ditches may have to be constructed. The experience of the settler has something to do with it, as well as the number of workers in the family. Some settlers almost from the beginning grow a large portion of the food required for the table; others buy their food and do not make the highest use of milk, butter, poultry, eggs, vegetables, and field crops grown or that can be grown. As a general rule a settler should not attempt the undertaking with less than from \$2,000 to \$3,000, and more would be better. There will, of course, be exceptions to this when special conditions will make up for the lack of capital.

Cost of developing raw land.—In order that settlers may consider the cost of developing raw land, an example is given hereunder. This does not refer to a particular project, but is merely to suggest to settlers that a program of financing and development is needed

beforehand which will assist them in the purchase and development of a farm:

Estimated expenditures for the first four years to convert 40 acres of raw land into a dairy and mixed farm

Item	First year	Second year	Third year	Fourth year
House, material only.....	\$600		\$100	
Barn, material only.....	400			\$150
Milk house, material only.....			\$50	
Chicken house, material only.....	75	50		
Pig house and pens, material only.....	50	75		
Cased well and pump.....	150			
Fences, corrals, etc.....	200	250		
Silo.....		400		
Clearing, leveling, etc.....	1,000			
Two horses.....	150			
Harness.....	65			
Cows (10).....	100	900		
Replacement cows.....			300	100
Bull (one-half interest).....		75		75
Sows (3).....	30	60		
Boar (one-third interest).....	20	20		20
Chickens.....	25	25		
Sheep (10 to 15).....		100		
Automobile (used).....	250			400
Walking plow.....	32			
Harrow, two sections.....	32			
Mower.....		105		
Rake.....		50		
Wagon gears.....	105			
Hayrack (material).....		15		
Hay stacker.....		110		
Separator and dairy utensils.....	5	120	5	5
Corrugator.....	15			
Single cultivator.....	12			
Lumber (miscellaneous).....		50	50	50
Small tools.....	50	10	10	10
Seed.....	85	15	15	40
Fruit trees and shrubs.....	50			
OPERATING				
Harvesting.....	10			
Threshing.....	25	25	25	25
Labor.....	300	100	150	150
Taxes.....	100	125	125	125
Insurance, fire.....	40	80	80	80
Water (O. & M.).....	40	15	20	25
Repairs and blacksmithing.....	5	15	25	25
Veterinary.....		150	150	150
Auto operation.....	150			
PERSONAL				
Furniture.....	400		100	
Living expenses.....	600	600	600	600
Life insurance.....	60	60	60	60
Amusements, etc.....	50	50	50	50
Dentist and doctor.....	50	50	50	50
Total.....	5,311	3,750	1,915	2,240

NOTE.—A settler possessing some of the items given can offset them against the cash required. Some settlers will find they can get along with less than the list given.

Available farms.—The amount of public land available is continually changing, which makes it inadvisable to include such a list in this booklet. Lists are kept up to date at the Denver, Colo., office of the Bureau of Reclamation, and may be obtained upon request. Privately owned land and developed farms are available on all the projects, and information in regard to such farms may be obtained by writing to the project superintendent of the project upon which information is desired.

HINTS TO SETTLERS

Farming is a business requiring skill, industry, and the use of capital intelligently directed to make it pay. The selection of a farm is an important step in the undertaking, to which careful consideration should be given. Hereunder is given a list of items which experience has shown should be considered by the settler before making a selection or purchase:

1. Ascertain from the project office:

- Amount of construction charge. Are any installments of such charge delinquent?
- Amount of supplemental construction charge. Are any installments of such charge delinquent?
- Amount of annual O. & M. charges. Are any such charges delinquent?
- Assessments made by water users' association or irrigation district. Are any such charges delinquent?
- Area of the farm classed as irrigable (charges are based on irrigable area).
- Are ditches and structures constructed to serve the farm with water?
- Has the land been soil surveyed? If it has, become familiar with map and soil types.
- Does the land need drainage? Has alkali developed?
- Is the land in a drainage or improvement district? Terms of repayment.

2. Inquire of county tax collector:

- Amount of State and county general taxes. Are such taxes delinquent?
- Amount of special assessment taxes and terms of payment for bond issues or contracts with United States. Are such taxes delinquent?

3. Inspect the farm in person and determine:

- Character of soil and depth.
- Area leveled for irrigation.
- Condition of farm ditches, buildings, and other improvements.
- Quality of domestic water.
- Drainage conditions and alkali.
- Character of crops and yields on adjacent farms.
- Distance to schools, churches, and trading towns; character of roads.

4. When these investigations have been made make out a financial and agricultural program allocating capital for the things needed, similar to the example given on page 12, and deduct from the total yearly expenditures a reasonable estimate for the value of crops that may be grown.

5. Whenever possible the land and surroundings should be inspected by the purchaser's wife, if he has one, as her judgment and opinions should be considered.

6. Inquire fully into status of title. (Sometimes the purchaser gets a deed and does not know for years after that title is in the United States. Project employees can advise purchaser how titles may be examined.)

ARIZONA, SALT RIVER PROJECT

THE Salt River project is located in the south central part of Arizona on both sides of Salt River, in the vicinity of Phoenix. The climate is semi-tropical and ranges in temperature from 20° F. to 117° F. The average annual precipitation is 8.34 inches. The elevation of the project averages about 1,200 feet above sea level.

The engineering feature upon which the project depends for its existence is the Roosevelt dam, which is described on page 2. Other features are Granite Reef Dam and Joint Head Dam, where water is diverted into a canal and lateral system 863 miles in extent. The water supply is furnished by the Salt and Verde Rivers and from deep wells within the project area. The irrigable area of the project is 213,170 acres, and all of it is in private ownership. The topography is smooth with gentle slopes for irrigation and the soils range from a sandy loam to a clay loam and are very fertile and easily worked.



Late Valencia oranges ready for the market, Salt River project, Ariz.

The long growing season favors the growth of a large variety of crops, which include citrus fruits, winter vegetables, head lettuce, cantaloupes, cotton, corn, small grains, and alfalfa. Cotton and alfalfa are the leading crops. Cotton yields from one-half to 1½ bales (500 pounds to bale), and alfalfa from 4 to 8 tons per acre, depending on the soil and methods of farming. Livestock is an important industry in the valley on account of the mild winter and outside ranges. Hogs and sheep do well on alfalfa and are finished with grain. Dairying is an important industry because of the abundance of feed produced. The range districts adjacent to the project are better suited to winter than to summer pasture on account of the dry summer season and scarcity of stock water. The mountainous districts to the east and north, however, fur-

nish feeding grounds for large herds of sheep and cattle during the summer months.

Many cotton gins and one cotton press are located on the project. Packing houses for fruit and vegetables, creameries, and milk condenseries are provided at convenient locations.

The Atchison, Topeka & Santa Fe and the Arizona Eastern Railroads run through the project, giving excellent transportation facilities. The valley is traversed by an extensive network of concrete highways, so that no farm is more than 2 miles distant from a pavement. Forage plants and grains usually find a market at home or within the State, but cotton, fruit, and vegetables are marketed in the large cities of the South and East. There are 14 towns within the project limits, which include Phoenix, Mesa, Tempe, Chandler, and Glendale, with a combined population of about 40,000. Phoenix has a population of 75,000 and is the principal city. The total population of the project is from 75,000 to 80,000.

There are 60 modern public schools on the project. The high school at Phoenix has a class A rating, which permits entrance of its graduates into many leading colleges without examination. All the leading churches and fraternal orders have organizations in Phoenix and many are represented in the smaller towns. Owing to the extensive system of paved roads, all sections of the project are able to enjoy the privileges of parks, theaters, lecture courses, and other advantages offered by a city of 30,000 inhabitants. Prescott and Flagstaff, situated in the mountains to the north, furnish excellent summer resorts for a week end or a month's vacation.

ARIZONA-CALIFORNIA, YUMA PROJECT

THE Yuma project is located in Yuma County, Ariz., and Imperial County, Calif., on both sides of the Colorado River, adjacent to Mexico. The climate on this project is hot in summer and mild in winter. During about four months of the summer the day temperatures are high, although the nights are generally not sultry. The other eight months are mild. Frosts usually occur from November to March. The average annual precipitation is 3.1 inches. The elevation of the irrigable lands varies from 80 to 140 feet above sea level.

The project is well served with engineering structures and a well-designed canal and lateral system to convey water from the Colorado River to the project lands. It has two unusual structures—the Laguna diversion dam, which is built across the Colorado River, and the Colorado River siphon, which carries the water from the California side to the Arizona side of the river. The river water carries silt, but a desilting basin at the intake works removes the heavier portion of this. The supply of irrigation water is always adequate. Good water for domestic purposes is obtained at depths of from 100 to 200 feet, at reasonable cost.

The gravity portion of the project comprises about 63,000 acres of bottom land, about 14,000 acres of which lie on the California side and the remainder on the Arizona side of the river. About 8,000 acres of the California tract have been allotted to Yuma Indians. The Yuma Valley proper is virtually all held in private ownership. The mesa, or pump, district comprises about 45,000 acres of high-lying, almost frost-free lands adjacent to the valley, only a portion of which are supplied with water at present. The topography of the valley lands is generally flat. Virtually all of the lands must be leveled, some at heavy expense, before water can be spread over them. The mesa lands also require leveling. The soils of the bottom lands are alluvial and

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very fertile, whereas the mesa soils are quite sandy; green or stable manure is used to build up their fertility.

The principal crops grown on the valley lands are cotton, alfalfa, and alfalfa seed. Barley, wheat, corn, sorghums, fruit, and vegetables are among the minor crops. Truck crops do well and it is anticipated that the area of such crops will increase. Lettuce is grown and sold in carload lots. The mesa lands are especially well adapted to oranges, grapefruit, grapes, figs, dates, and winter vegetables. The yield of all crops is high where proper attention is given to their culture. The conditions are particularly favorable to dairying because of the absence of cold and stormy weather. Expensive outbuildings are unnecessary, stock water is easy to obtain, and grazing is good the year round. Alfalfa grows in great abundance. Proximity to the Pacific coast cities insures a favorable market for stock. Sheep and cattle feeding during the winter season has been found profitable and is increasing. Hogs and poultry do well because of a plentiful supply of green feed.



Grapefruit trees, Yuma project, Ariz.-Calif.

Since cotton growing is one of the chief industries, cotton gins are established in the valley and at Yuma.

The main line of the Southern Pacific system from New Orleans to Los Angeles and San Diego crosses the project at Yuma and gives quick service to the Pacific coast cities, the Gulf of Mexico, and eastern markets. A Government-owned railway runs from Yuma to the lower end of the valley. The project is traversed by two lines of paved highways with three crosslines. No farm is more than 2 miles from a pavement. The Dixie National Highway passes through Yuma and furnishes an outlet to the Pacific coast over an almost continuous pavement.

The towns of the project are Yuma, Somerton, Gadsden, and Bard. Yuma is the principal business center and has a population of about 5,000. The farm population is about 4,200; there is room for more. The project is well provided with educational facilities. Paved roads and open weather permit

the transportation of school children several miles to well-equipped consolidated schools. A modern union high school is located in Yuma. Most of the principal religious denominations have organizations in Yuma, and the smaller towns of the district also have churches. Fraternal organizations are well represented in Yuma, and social activities are amply provided for. Because of warm summer weather, recreation is taken at the beaches along the Pacific Ocean in the vicinity of San Diego or Los Angeles.

CALIFORNIA, ORLAND PROJECT

THE Orland project is located in the north central portion of the Sacramento Valley, 100 miles north of Sacramento and 166 miles north of San Francisco. The climate is semitropical. The mean annual temperature at Orland for a period of 39 years is 63.7° F., and the range is from 20° to 114° F. Damaging frosts seldom occur. The average rainfall is 17.8 inches, most of which occurs during the winter season. The elevation of the irrigated lands varies from 180 to 330 feet above sea level.

The engineering features include the East Park Reservoir and Dam on Little Stony Creek; a feed canal 7 miles long running from Stony Creek to the reservoir; three diversion dams; and 138 miles of canals and laterals, 90 miles of which are concrete lined. All the irrigation structures are of concrete. Water for irrigation is diverted from Stony Creek into East Park Reservoir, which has a capacity of 51,000 acre-feet. The supply is ordinarily adequate to produce satisfactory crops, but in very dry seasons shortages occur.

The irrigable area of the project is 20,600 acres, and of this 15,500 acres are irrigated. The lands are generally smooth with a slope of about 15 feet to the mile toward the Sacramento River. Water is applied to the land by the border system. The underground drainage is good. The soil consists of



Drying almonds, Orland project, Calif.

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The irrigable area of the project is 20,600 acres, and of this 15,500 acres are irrigated. The lands are generally smooth with a slope of about 15 feet to the mile toward the Sacramento River. Water is applied to the land by the border system. The underground drainage is good. The soil consists of



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alluvial deposits from Stony Creek with an admixture of wash from adjacent more elevated areas. The varieties are gravelly loam, clay, and sediment loam, all deep and very productive. There is no hardpan nor alkali.

A great variety of products are grown, including alfalfa, milo maize, barley, almonds, English walnuts, prunes, figs, peaches, apricots, pears, grapes (both table and raisin), olives, watermelons, casabas, and many varieties of berries. Alfalfa predominates in acreage, but nuts and fruits are also grown on a commercial scale. The Orland oranges mature early, and because of this command high prices for the holiday trade. Alfalfa yields from 4 to 7½ tons per acre per year, with five cuttings, and yields of other crops are generally high because of the long growing season. Dairying is an important and profitable business, owing to the mild climate, good markets, and feed conditions. Poultry raising is an important industry. The hills and mountains west of the project are used extensively for grazing.

Local industries comprise two creameries, an alfalfa meal mill, a packing house for oranges and almonds, and several cooperative marketing organizations. The Southern Pacific Railway and the concrete-paved State highway pass through the project and connect it with San Francisco and Portland. Orland, having a population of 1,700, is the principal town. The farm population is about 2,000. There are nine grade schools and one high school within the boundaries of the project. There are many church, fraternal, and other social organizations. The farm bureau provides social and educational advantages. For the boys and girls there are Camp Fire and Boy Scout organizations. In the Coast Range Mountains, within a few hours' auto drive from Orland, are found deer, bear, mountain lions, and trout; and in the valley and foothill regions adjacent to the project are quail, doves, wild ducks, and geese.

COLORADO, GRAND VALLEY PROJECT

THE Grand Valley project is in the western part of Colorado, near the town of Grand Junction, and runs along the north side of the Grand Valley for about 40 miles. The average elevation is 4,700 feet above sea level. The climate is mild, wind movement is moderate, and the seasons are unusually long, 182 days being the average time between killing frosts. Precipitation is about 8 inches and the number of clear days averages 254 per year.

A roller-crest dam diverts water from the Colorado River into a canal which extends westward along the north side of the Grand Valley for about 55 miles. The canal, with a capacity of 1,425 second-feet at its head, and its distributing laterals deliver water to each farm unit. Stored water is not needed because of the abundant supply in the river. Water for domestic and stock purposes is taken from the canal and stored in cisterns, tanks, or reservoirs. The present irrigation system covers an area of approximately 30,500 acres, which is nearly all farmed and irrigated. When the gravity canal system is completed it will cover 35,000 acres. In addition to this it is planned to irrigate 10,000 acres by pumping. The system also carries water for 10,000 acres of private lands in the Orchard Mesa district.

The district is quite rolling, with considerable fall toward the river. Numerous arroyos or washes furnish outlets for drainage and storm water. The soils consist of three general types—red sandy mesas, sandy loam, and adobe. The red soils are deep and well drained and are especially adapted for the growing of fruit, alfalfa, and potatoes, although other crops do well on them. The sandy loam is an alluvial deposit composed of a mixture of mesa soil and adobe. These soils are well adapted to general farm crops but are not considered as valuable for fruit growing as the mesa type. Adobe soils are of

a heavier nature and are especially adapted to alfalfa, sugar beets, and cereals.

The principal crops are alfalfa, sugar beets, corn, oats, potatoes, and wheat. Apples and other North Temperate Zone fruits are grown on the project, and string beans and tomatoes are also profitably grown. The best lands on the project will produce 5 tons of alfalfa per acre when well farmed, and other crops proportionately. The average yield of alfalfa is, however, approximately 3 tons per acre. Favorable climate, cheap winter forage, proximity to good range, and freedom from diseases make livestock raising attractive. A number of farmers are engaged in feeding range cattle during the winter months. This practice utilizes surplus feed. Dairying is developing rapidly. The territory surrounding the Grand Valley project comprises high plateaus and mountain ranges that furnish summer pasture for a great many cattle and sheep.



Irrigating a peach orchard, Grand Valley project, Colo.

At Grand Junction are located a creamery, flour mill, canning factory, broom factory, sugar factory, and packing house, which provide a market for much of the produce raised on the project. The project is on the main line of the Denver & Rio Grande Western Railroad. An interurban electric line operates between Grand Junction and Fruita, and extensions to this line are contemplated. None of the farms is more than 6 miles from a railroad shipping point. The Pikes Peak Ocean to Ocean Highway extends through the valley from east to west. Surrounding mountain and mining towns and local valley towns furnish a good market for some of the products, and fruit is shipped to Denver and eastern markets.

Grand Junction, at the eastern end of the project, has a population of 9,000 and is the county seat of Mesa County. It has two daily newspapers, several banks, many factories and plants, and is also a distributing center for the large packing and wholesale houses, which maintain branch houses at this point.

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A great variety of products are grown, including alfalfa, milo maize, barley, almonds, English walnuts, prunes, figs, peaches, apricots, pears, grapes (both table and raisin), olives, watermelons, casabias, and many varieties of berries. Alfalfa predominates in acreage, but nuts and fruits are also grown on a commercial scale. The Orland oranges mature early, and because of this command high prices for the holiday trade. Alfalfa yields from 4 to 7½ tons per acre per year, with five cuttings, and yields of other crops are generally high because of the long growing season. Dairying is an important and profitable business, owing to the mild climate, good markets, and feed conditions. Poultry raising is an important industry. The hills and mountains west of the project are used extensively for grazing.

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COLORADO, GRAND VALLEY PROJECT

THE Grand Valley project is in the western part of Colorado, near the town of Grand Junction, and runs along the north side of the Grand Valley for about 40 miles. The average elevation is 4,700 feet above sea level. The climate is mild, wind movement is moderate, and the seasons are unusually long, 182 days being the average time between killing frosts. Precipitation is about 8 inches and the number of clear days averages 254 per year.

A roller-crest dam diverts water from the Colorado River into a canal which extends westward along the north side of the Grand Valley for about 55 miles. The canal, with a capacity of 1,425 second-feet at its head, and its distributing laterals deliver water to each farm unit. Stored water is not needed because of the abundant supply in the river. Water for domestic and stock purposes is taken from the canal and stored in cisterns, tanks, or reservoirs. The present irrigation system covers an area of approximately 30,500 acres, which is nearly all farmed and irrigated. When the gravity canal system is completed it will cover 35,000 acres. In addition to this it is planned to irrigate 10,000 acres by pumping. The system also carries water for 10,000 acres of private lands in the Orchard Mesa district.

The district is quite rolling, with considerable fall toward the river. Numerous arroyos or washes furnish outlets for drainage and storm water. The soils consist of three general types—red sandy mesas, sandy loam, and adobe. The red soils are deep and well drained and are especially adapted for the growing of fruit, alfalfa, and potatoes, although other crops do well on them. The sandy loam is an alluvial deposit composed of a mixture of mesa soil and adobe. These soils are well adapted to general farm crops but are not considered as valuable for fruit growing as the mesa type. Adobe soils are of

a heavier nature and are especially adapted to alfalfa, sugar beets, and cereals.

The principal crops are alfalfa, sugar beets, corn, oats, potatoes, and wheat. Apples and other North Temperate Zone fruits are grown on the project, and string beans and tomatoes are also profitably grown. The best lands on the project will produce 5 tons of alfalfa per acre when well farmed, and other crops proportionately. The average yield of alfalfa is, however, approximately 3 tons per acre. Favorable climate, cheap winter forage, proximity to good range, and freedom from diseases make livestock raising attractive. A number of farmers are engaged in feeding range cattle during the winter months. This practice utilizes surplus feed. Dairying is developing rapidly. The territory surrounding the Grand Valley project comprises high plateaus and mountain ranges that furnish summer pasture for a great many cattle and sheep.



Irrigating a peach orchard, Grand Valley project, Colo.

At Grand Junction are located a creamery, flour mill, canning factory, broom factory, sugar factory, and packing house, which provide a market for much of the produce raised on the project. The project is on the main line of the Denver & Rio Grande Western Railroad. An interurban electric line operates between Grand Junction and Fruita, and extensions to this line are contemplated. None of the farms is more than 6 miles from a railroad shipping point. The Pike's Peak Ocean to Ocean Highway extends through the valley from east to west. Surrounding mountain and mining towns and local valley towns furnish a good market for some of the products, and fruit is shipped to Denver and eastern markets.

Grand Junction, at the eastern end of the project, has a population of 9,000 and is the county seat of Mesa County. It has two daily newspapers, several banks, many factories and plants, and is also a distributing center for the large packing and wholesale houses, which maintain branch houses at this point.

Other towns are Fruita, Loma, and Mack. There are four rural schools on the project. High schools are located at Grand Junction and Fruita. All of the towns serving the project have churches. Grand Mesa, 10,000 feet in elevation, is within a day's drive of the project. This flat-topped mountain has on it more than 200 lakes, stocked with trout. The mountains and canyons are picturesque and afford abundant recreation.

COLORADO, UNCOMPAHGRE PROJECT

THE Uncompahgre project is located in Montrose and Delta Counties, along the Uncompahgre River. The climatic conditions are healthful and agreeable throughout the year. The average annual precipitation is 10 inches. The temperature ranges from a maximum of 98° F. to a minimum of -25° F. The number of clear days in the year varies from 225 to 274. The elevation of the irrigable lands ranges from 4,900 to 6,400 feet above sea level.

The Gunnison Tunnel is 6 miles in length and conducts water from the Gunnison River to the Uncompahgre River. Other engineering features are the canal system, the diversion dam on the Gunnison River, and a number of diversion structures on the Uncompahgre River. The water supply is obtained from the natural flow of the Uncompahgre River, supplemented by water from the Gunnison River. The irrigation waters are distributed to the irrigable lands by means of eight large canal systems from the Uncompahgre River, together with numerous small laterals. About 470 miles of canals and laterals have been constructed. Domestic water is obtained from deep wells.



Registered Holsteins, Uncompahgre project, Colo.

The irrigation works are designed to irrigate approximately 130,000 acres of land. The country is rolling, with considerable slope to the north and west. The irrigable area comprises a number of benches and flats with abrupt declivities separating them. Some smoothing and floating is required before irrigating the land. The soils consist of red sandy, gravelly, and adobe and clay loams. The adobe and clay soils are located mainly on the east side of the Uncompahgre River, and are suitable for raising alfalfa, grains, and sugar

beets. The river bottom soils are peculiarly adapted to onions and garden products. The red sandy and gravelly soils on the west side of the river are generally suited to all crops, but are usually devoted to high-priced crops, such as fruits and potatoes.

The principal crops grown are alfalfa, wheat, potatoes, oats, corn, apples, and sugar beets. Alfalfa yields from 2 to 5 tons per acre; wheat, approximately 30 bushels; potatoes, from 175 to 250 bushels; oats, 30 bushels; and sugar beets, from 8 to 12 tons per acre. The furrow system of irrigation is used exclusively in this valley. Stock raising has been one of the principal industries on the project. Dairying is an important industry and is increasing. Concentrated products, such as butterfat, cheese, and sugar are safe lines of production because of long distances to markets and consequent high transportation charges. The Uncompahgre Valley is bordered on nearly all sides by tablelands that afford summer range for cattle and sheep. There are also, within a short distance of the project, large areas of forests that are controlled by the United States Forest Service and leased on favorable terms to stockmen.

The project is served industrially by three flour mills, one radium sampler, two creameries, two brick and tile plants, three elevators, one canning factory, one sugar factory, and one artificial ice plant. Montrose County has a farm bureau and employs a county agent. The project offers opportunity for canning factories, cheese plants, and other industries which could utilize the many products grown. The Denver & Rio Grande Western R. R. bisects the project, and good roads extend throughout the project and to neighboring towns over which auto freight lines are operated. The Rainbow Route, a part of the transcontinental highway system of the country, passes through the project. Livestock is marketed at Denver, Omaha, and Kansas City. Sugar beets are sent to the factory at Delta; onions and fruit are shipped to Denver and eastern points. Local mining camps offer a market for vegetables and garden products, and alfalfa is fed to stock or disposed of locally to stockmen.

Montrose, the county seat of Montrose County, has a population of 4,000. Other project towns are Delta and Olathe, having populations of 2,700 and 750, respectively. These towns have chambers of commerce, luncheon clubs, and are progressive. The farm population in 1923 was 6,097. Twenty-six schools serve the project, 19 of which are in the rural districts. Accredited high schools are located in the three towns above mentioned. The principal religious denominations are represented and have churches in the towns of the project. The Uncompahgre Valley is located in one of the most picturesque sections of America. The San Juan Mountains are within a two hours' drive from Montrose. Excellent trout fishing and hunting are found in the mountains near by. The Gunnison River is noted for its scenery and fishing.

IDAHO, BOISE PROJECT

THE Boise project is located in southwestern Idaho and eastern Oregon, adjacent to the city of Boise. The general elevation of the project is 2,500 feet above sea level. The temperature rarely goes below zero or above 100°. The winters are generally mild and free from wind. The summers are long, sunny, and warm, and with irrigation plant growth is rapid. The precipitation at Boise for the past 58 years has averaged 13.7 inches per year.

The engineering works consist of the Arrowrock Dam and Reservoir, described on page 2, together with a complete canal and lateral system to supply the individual farms. The water supply is obtained from the natural

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flow of the Boise River, together with stored water in Arrowrock and Deer Flat Reservoirs. Approximately 150,000 acres are in the project. This land is all in private ownership and the greater part of it under cultivation. The topography is gently rolling and well suited to irrigation. The soils are variable in texture and composition and range from clay loam to sandy loam. They are usually deep and fertile.

Alfalfa is the standard field crop, of which an average yield of about 4.3 tons per acre is obtained. A large amount of winter and spring wheat is produced. Corn produces either a heavy crop of grain or ensilage. Both early and late potatoes are produced in large quantities. Head lettuce, cabbage, cauliflower, celery, melons, and onions are produced commercially. Livestock and dairying are profitable, as the mild climate and long growing season for pasture and forage grasses favor these industries. Large numbers of range stock are brought into the valley for winter feeding from the surrounding table-lands and mountain ranges, where summer pasture is usually good and cheap.

The main line of the Oregon Short Line Railway extends through the project from east to west, with four branch lines connecting all of the project towns. Trolley lines have been extended from the principal towns to cover portions of the valley. Most of the alfalfa and corn is fed to dairy cattle, range and breeding stock, and to animals being prepared for market. The greater part of the apples, prunes, potatoes, lettuce, and clover seed is shipped to interior points and eastern markets. Gravel and hard-surface highways have been constructed over the project.

Boise has a population of 25,000; Nampa, 6,000; Caldwell, 6,000; and Parma, Meridian, Kuna, Melba, Notus, and Wilder are all thriving towns on or adjacent to the project. The farming population is about 11,550. The school facilities are excellent. All of the towns have high schools and grammar schools. The College of Idaho is located at Caldwell, and has a large attendance. In Boise there are St. Margaret's Hall, St. Teresa's Academy, and two well-equipped business colleges. The mountains immediately adjacent to the project on the north and east furnish excellent opportunities for hunting, fishing, and picnicking.



Stacking alfalfa, Boise project, Idaho

IDAHO, KING HILL PROJECT

THE King Hill project is located along the Snake River in the southwestern part of Idaho. The climate of the district is mild. The temperature rarely goes below zero and the summers are long and warm, considering the latitude. The average annual precipitation is about 9 inches. The elevation of project lands averages about 2,600 feet above sea level. The main canal is about 50 miles long and contains a number of wood-stave pipe and reinforced concrete siphons and has approximately 10 miles of concrete flume and 9 miles of concrete lining. The capacity of this canal is 300 second-feet. The laterals are short and deliver water to each farm.

The water supply for irrigation is obtained from the Malad River, but is passed to the project canal by the Idaho Power Co. Domestic water is obtained from the canals or hauled from the river. Artesian water is obtainable at considerable depths.



Big Alkali flume, King Hill project, Idaho

Approximately 10,000 acres are under irrigation. The lands of the project are generally rolling, with some smooth areas. Soils vary in texture from sandy loam to clay, the latter type occupying the lower and smoother sections.

Virtually all crops which can be grown in temperate zones yield well on the King Hill project. Early springs and mild winters permit the production of early vegetables. Corn yields heavily for either grain or ensilage and wheat and oats do well. Alfalfa, the standard field crop, produces an average of 4 tons per acre, corn yields about 50 bushels, oats and barley about 35 to 40 bushels, and wheat 20 to 30 bushels. The project is surrounded by more or less desert areas of large extent that produce scant but nutritive grasses, upon which thousands of sheep range during the greater part of the year. These range stock furnish a means of disposing of a considerable portion of the hay grown on the project lands.

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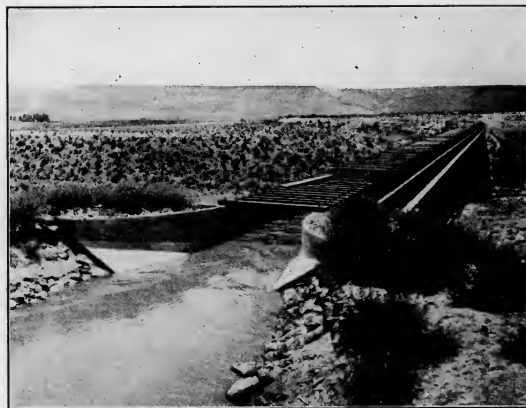


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The Oregon Short Line Railway traverses the entire length of the project and furnishes a good outlet to Pacific coast and eastern markets. The Oregon Trail highway passes through the project from east to west and connects the district with Boise and Pacific coast points.

Towns on the project are Glens Ferry, Hammett, and King Hill. Glens Ferry has a population of about 1,600 and is larger than the others mentioned. The schools on the project are modern. The principal religious denominations are represented with organizations and places of worship which also furnish centers for community and social life. A few hours' ride in an automobile enables one to reach the timber-covered mountains.

IDAHO, MINIDOKA PROJECT

THE Minidoka project is located in south central Idaho on both sides of Snake River. In 1904 it was an uninhabited sagebrush desert. It is now a fertile and productive area with an annual gross production of from \$3,500,000 to \$4,000,000. The climate is dry and invigorating, with sunshine prevailing for a large part of the year. Temperatures rarely exceed 100° F. The average number of clear days per year is 252. The average frost-free period is 118 days, and the average elevation of the irrigable area is 4,225 feet above sea level.

The water supply for irrigation is derived from the direct flow of Snake River, supplemented by storage in Walcott Lake at the Minidoka diversion dam of 95,000 acre-feet, and in Jackson Lake, at the foot of the Rockies, with 847,000 acre-feet capacity. The American Falls Reservoir, authorized but not constructed, will store from 1,070,000 to 1,700,000 acre-feet, depending on the type of structure, and is also located on Snake River. At Minidoka Dam a Government power plant develops 10,000 horsepower and serves 1,200 farmers with cheap electricity. At this point, also, water is diverted to complete canal systems on both sides of the river that deliver water to each individual farm.



Electrically heated residence, Minidoka project, Idaho

On the north side of the river is an area of 65,000 acres irrigated by gravity; on the south side 56,500 acres are irrigated by electrically driven pumps with three lifts, and 7,500 acres by gravity. The lands, in general, have a gentle slope toward the river, with sufficient grade to facilitate irrigation and drainage. The soil types vary from loose sandy loam to very fine sandy loam and clay loam.

During the past 10 years the principal crops grown, with average yields per acre, have been: Wheat, 26 bushels; oats, 32 bushels; barley, 33 bushels; potatoes, 178 bushels; beets, 11 tons; and alfalfa, 3 tons. The most satisfactory results come from diversification of crops in a well-planned rotation, together with dairying, hogs, and poultry. Considerable money is made in fattening sheep and cattle. The absence of extreme weather conditions and the light precipitation make more or less ideal conditions for the production of livestock and poultry of all kinds. The inland location of the project and consequent high freight rates also favor the consumption of bulky crops at home. Dairying is an important industry and is increasing.

Two sugar factories have been established on the project, one at Burley and the other at Paul. Five cheese factories are operating in project towns. A large quantity of milk and cream is also shipped to creameries at Twin Falls, Pocatello, and Butte. Extensive feeding of livestock is done at the yards of the Portland Feeder Co. near the sugar factories. An alfalfa meal mill and large flour mills operate at Burley.

The main line of the Oregon Short Line Railroad serves the lands of the Minidoka project. From Minidoka a branch line to the Twin Falls section runs through the heart of the project. The Rupert-Bliss cut-off diverges at Rupert and runs westward across the North Side gravity division.

The principal towns on the project are Burley, Rupert, Heyburn, Paul, Acequia, and Declo. The schools at Burley, Rupert, and Paul are exceptionally good, and accredited high schools are operated in the three towns. High schools are also conducted at Heyburn and Declo. In 1923 there were 15 schools on the gravity division and 7 schools on the South Side pumping division. There are 29 churches on the project representing the leading denominations. Other organizations, such as lodges, granges, clubs, and improvement associations, are numerous and well distributed.

The Bureau of Reclamation maintains a small park at Minidoka Dam, which is a favorite recreation center for the people on the project. It is adjacent to Lake Walcott, where fishing, boating, and bathing may be enjoyed. The mountains north and south of the project afford many fine camping sites.

MONTANA, HUNTLEY PROJECT

THE Huntley project is in Yellowstone County, Mont. It extends along the south side of the Yellowstone River east of Billings. The climate is variable; the winters are sometimes open and mild with little snowfall, although at other times they may be more severe. The growing season averages about 135 days between killing frosts, and the annual precipitation averages 13 inches. The altitude is 3,000 feet above sea level.

The main canal, which has a capacity of 500 second-feet, diverts water from the Yellowstone River. Storage water is not necessary because of the abundance of water in the river. Two pumping plants near Ballantine lift 100 second-feet of water into the high-line canal, which serves about 5,400 acres. Domestic water is secured from shallow wells or caught in cisterns from buildings.

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The project comprises an area of 32,000 acres of land lying in a compact body that facilitates irrigation and social development. The surface of the land is generally smooth, with slopes of 10 to 25 feet per mile. Such grades make irrigation practice simple. The soil is generally heavy and of good quality. Alkali is prevalent on some of the land, and such land should not be acquired by the inexperienced.

Crops adaptable to the region include sugar beets, alfalfa, wheat, corn, beans, and potatoes. Small fruit, vegetables, sweet corn, tomatoes, cucumbers, squash, cantaloupes, and watermelons have been grown in considerable quantities and mature successfully. Average yields over a 10-year period are as follows: Beets, 9.5 tons; alfalfa, 2.5 tons; wheat, 18.5 bushels; and potatoes, 107 bushels. The climate is suited to livestock growing, and dairying is a profitable industry. Sheep feeding is also one of the chief enterprises. Adjacent to the project are extensive areas of pasture land which may be grazed from early spring until November.



Sugar beets, Huntley project, Mont.

Beets are shipped to the sugar factory at Billings and cream to the creamery at Worden. The Project Supply Co. of Osborn is a cooperative organization which handles produce, coal, grain, etc. A large cooperative grain elevator is operated at Ballantine.

The Northern Pacific and the Chicago, Burlington & Quincy Railroads serve the project. The roads are generally well graded and kept in good condition. The Yellowstone Trail, which traverses the project, is an excellent graveled highway connecting local towns and Billings. The principal markets are the mining towns in the State and the large cities in the Mississippi Valley.

The towns of the project are small, and in order of their importance are: Ballantine, Worden, Huntley, and Pompeys Pillar. Billings is a distributing center and is 15 miles from the project. The project is served with good schools. An accredited high school is maintained at Worden, the geographical

center of the project. Under the consolidated system all children of school age are transported to the centralized schools, which are well equipped with teachers and demonstration material. Established churches are to be found in all the large towns; the outlying districts are also served by the pastors from the larger places. At Ballantine a large community building has been erected, which serves as a meeting place for settlers to conduct their business or for social gatherings.

MONTANA, MILK RIVER PROJECT

THE Milk River project is located in northeastern Montana, about 50 miles south of the Canadian boundary, in the vicinity of Glasgow and Malta. Temperatures reach 100° in the summer and drop to -40° F. in the winter. The winters are not so severe as might be expected from such a temperature; stock ordinarily graze in the open all winter. The last spring and first fall frosts are to be expected about June 1 and September 20. Notwithstanding the comparatively short growing period, the season is favorable for rapid plant growth, owing to the long summer days. The average annual precipitation at Malta is 13.24 inches, of which 10.6 inches occur during the growing season. The average elevation is 2,200 feet.



Bean field, Milk River project, Mont.

Water from St. Mary Reservoir is carried through a canal a distance of 30 miles, diverted into Milk River, which passes through Canadian territory for 216 miles and then returns to the United States, where the water is taken out for use on the project by means of low diversion dams. This reservoir supplements the flow of the Milk and St. Mary Rivers.

The bureau is now prepared to serve about 96,000 acres, half of which is actually irrigated. Good land can be bought very cheaply. With few exceptions, the soil of the Milk River Valley is fine in texture. Along the river it is classed as silt loam or fine sandy loam; away from the river it gradually changes into a finer-textured loam or clay, and more remotely into a soil known as gumbo. The silt loam is highly productive and easy to work. The intermediate type is also productive, although somewhat refractory, and the gumbo soils are still more difficult and often less productive than the others.

The project comprises an area of 32,000 acres of land lying in a compact body that facilitates irrigation and social development. The surface of the land is generally smooth, with slopes of 10 to 25 feet per mile. Such grades make irrigation practice simple. The soil is generally heavy and of good quality. Alkali is prevalent on some of the land, and such land should not be acquired by the inexperienced.

Crops adaptable to the region include sugar beets, alfalfa, wheat, corn, beans, and potatoes. Small fruit, vegetables, sweet corn, tomatoes, cucumbers, squash, cantaloupes, and watermelons have been grown in considerable quantities and mature successfully. Average yields over a 10-year period are as follows: Beets, 9.5 tons; alfalfa, 2.5 tons; wheat, 18.5 bushels; and potatoes, 107 bushels. The climate is suited to livestock growing, and dairying is a profitable industry. Sheep feeding is also one of the chief enterprises. Adjacent to the project are extensive areas of pasture land which may be grazed from early spring until November.



Sugar beets, Huntley project, Mont.

Beets are shipped to the sugar factory at Billings and cream to the creamery at Worden. The Project Supply Co. of Osborn is a cooperative organization which handles produce, coal, grain, etc. A large cooperative grain elevator is operated at Ballantine.

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center of the project. Under the consolidated system all children of school age are transported to the centralized schools, which are well equipped with teachers and demonstration material. Established churches are to be found in all the large towns; the outlying districts are also served by the pastors from the larger places. At Ballantine a large community building has been erected, which serves as a meeting place for settlers to conduct their business or for social gatherings.

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These lands occupy a long, narrow strip along the Milk River Valley, and have relatively flat slopes.

The lands are adapted to diversified farming in holdings of 80 to 100 acres. Good yields of alfalfa, grains, corn, hardier vegetables, and sugar beets are obtained. The latter crop is not grown commercially at the present time, but experimental plots indicate its feasibility. Alfalfa seed is often a valuable crop. Livestock is the principal industry. Beef and dairy cattle, hogs, and sheep are kept. Owing to the long winters, it is necessary to have stock well housed for the best results. Winter feeding and fattening of stock are engaged in extensively on the project. Northern and eastern Montana are suited to grazing during the summer season, when the plains are covered with native grasses. The summer herds of the prairies consume the hay of the irrigated districts.

There are three flour mills, three creameries, a seed grower's association, and a hay grower's association on the project. When completely developed, the project will support a sugar factory, additional creameries, and a number of cheese factories.

The main line of the Great Northern Railway passes through the project in an easterly and westerly direction. Towns or sidings are located at distances of 5 or 6 miles along the line. The Roosevelt International Highway parallels the railway.

Much of the native blue-joint hay goes west to the lumber camps of Idaho and Washington, whereas most of the alfalfa and all of the corn crop are fed locally to livestock. In 1923 several carloads of registered Grimm alfalfa seed were sold in New York State. Local markets consume all the dairy and poultry products.

The principal project towns and populations are as follows: Chinook, 1,200; Harlem, 700; Dodson, 300; Malta, 1,400; Saco, 400; Hinsdale, 400; Glasgow, 2,000; and Nashua, 300. All of these towns have electric lights, water, and sewers. The farm population amounts to about 1,100, but there is room for more. The larger towns maintain high schools and grade schools. In the vicinity of some of the towns pupils are brought to consolidated schools from distances of 6 or 8 miles. The principal religious denominations have churches in the towns. Fishing and hunting in the vicinity offer recreation. The Glacier National Park is adjacent to the St. Mary storage and affords opportunities for summer camping.

MONTANA, SUN RIVER PROJECT

THE Sun River project is situated in Teton, Lewis and Clark, and Cascade Counties, Mont., lying north and west of the city of Great Falls. The elevation of the lands is approximately 3,700 feet above sea level. The temperature varies from 40° below zero to 100° above. The extreme low temperatures are unusual and occur only for short periods. The average rainfall is about 11 inches, a large portion of which occurs from April to July. The frost-free season averages from May 20 to September 15.

The Fort Shaw division is irrigated by the Fort Shaw Canal, which takes water direct from Sun River. The lands on the north side of the river are irrigated by water diverted by the Sun River diversion dam through canals and laterals to the individual farms. Water is furnished by the Sun River and its tributaries, Deep Creek, a tributary of Teton River, and Bowl and Basin Creeks, tributaries of the Flathead River. Domestic water is obtained from wells.

Irrigation works have been constructed for about 52,000 acres, of which approximately 14,000 acres are in the Fort Shaw division and 38,000 in the Greenfields division. The general character of the irrigable lands is rolling, with ample fall for irrigation. The surface is reasonably smooth and very little leveling is done. The soils, mainly a light clay or silt loam with some gravel, are fertile and give good results when properly farmed. The crops grown are alfalfa, native hay, grain, and vegetables. Sugar beets are grown experimentally. Good yields are obtained from crops adapted to the district.

On account of the cold winters it is necessary that all kinds of livestock be protected against severe storms and well provided with feed. Many settlers are engaged in raising hogs, cattle, and sheep. Dairying is profitable if cows are properly housed and attended. The grass-covered plains that extend for many miles outside of the project furnish summer feed for cattle and sheep. The forest reserve in the mountains to the west also furnishes good pasture.

Great Falls, just off the project, has a large smelter, several flour mills, and many miscellaneous plants which employ a large number of men and furnish a market for much of the produce grown under irrigation. A large packing plant at this place takes care of most of the fat hogs and cattle produced locally.

The project is traversed by three lines of the Great Northern Railway, and by one line of the Chicago, Milwaukee & St. Paul Railway. The Park to Park Highway runs through the project. The principal towns tributary to the lands now under irrigation are Sun River, population 20; Fort Shaw, 100; Simms, 80; and Fairfield, 170. Great Falls, a city of 25,000 inhabitants, is located in the easterly portion of the project. This is now the second largest city in the State and is growing both in population and industrially. The project is served by good schools, and churches of the leading denominations have been established in the towns. Great Falls offers recreation to the settlers, and a few hours' drive is all that is required to reach Glacier National Park or many other fine summer resorts.



Field of new oats, Sun River project, Mont

These lands occupy a long, narrow strip along the Milk River Valley, and have relatively flat slopes.

The lands are adapted to diversified farming in holdings of 80 to 100 acres. Good yields of alfalfa, grains, corn, hardier vegetables, and sugar beets are obtained. The latter crop is not grown commercially at the present time, but experimental plots indicate its feasibility. Alfalfa seed is often a valuable crop. Livestock is the principal industry. Beef and dairy cattle, hogs, and sheep are kept. Owing to the long winters, it is necessary to have stock well housed for the best results. Winter feeding and fattening of stock are engaged in extensively on the project. Northern and eastern Montana are suited to grazing during the summer season, when the plains are covered with native grasses. The summer herds of the prairies consume the hay of the irrigated districts.

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MONTANA, SUN RIVER PROJECT

THE Sun River project is situated in Teton, Lewis and Clark, and Cascade Counties, Mont., lying north and west of the city of Great Falls. The elevation of the lands is approximately 3,700 feet above sea level. The temperature varies from 40° below zero to 100° above. The extreme low temperatures are unusual and occur only for short periods. The average rainfall is about 11 inches, a large portion of which occurs from April to July. The frost-free season averages from May 20 to September 15.

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Field of new oats, Sun River project, Mont

MONTANA-NORTH DAKOTA, LOWER YELLOWSTONE PROJECT

THE Lower Yellowstone project lies along the north side of the Yellowstone River, in eastern Montana and extends into North Dakota. The latitude is 48° N., and winters are sometimes severe. The average of the highest and lowest temperatures recorded during the past 17 years is 103° and -35° F., respectively. The average precipitation for the same period is 15 inches. The frost-free period averages 129 days. Owing to the latitude, the days in summer are long. The average elevation of the project is 1,900 feet.



Lower Yellowstone diversion dam, Lower Yellowstone project, Mont.-N. Dak.

The diversion dam is located about 18 miles below Glendive, Mont., on the Yellowstone River, and the main canal extends from that point to the Missouri River, a distance of about 70 miles. A direct-connected hydraulic pumping plant near Savage, Mont., furnishes water for 3,000 acres of bench lands. The lateral system delivers water to each farm. The Yellowstone River provides an abundance of water for irrigation. Domestic and stock water may be obtained from shallow wells, the quality of which is not always good; in this event domestic water is provided from rain-filled cisterns.

The irrigable area of the project is about 59,000 acres, served by the ditches provided. The topography of the district is generally flat with just sufficient fall to facilitate irrigation. Some of the higher areas are rolling. The soil varies from a sandy loam to silt loam; it is fertile, deep, and easily worked. A certain amount of alkali exists in the soil, but can be controlled by drainage.

The principal crops are alfalfa, sugar beets, cereals, corn, and potatoes. The yields of these crops are generally good and range from 20 to 30 bushels of wheat, 2 to 4 tons of alfalfa, 30 to 40 bushels of corn, 3 to 6 tons of potatoes, and 8 to 15 tons of sugar beets. Truck and berries do well. The climate and general conditions are suitable for stock raising and dairying; but, on account

of the long winter seasons, good shelter should be provided. Sheep do especially well, and the fattening of lambs for market on alfalfa, beet tops, and grain is a profitable industry. Cheap forage crops make dairying profitable. Surrounding the project on all sides are large areas of semiarid rolling plains covered with native grasses that support many thousands of sheep and cattle. For the ambitious project farmer this large grazing territory furnishes an opportunity to expand his stock-raising program beyond the capacity of his irrigated farm. Range stock feeding furnishes a market for the hay and grain grown by many settlers.

A branch line of the Northern Pacific Railway runs from Glendive to Sidney and meets a branch line of the Great Northern Railway, thus giving the project a railway throughout its entire length. A well-graded highway runs through the project, connecting with the Roosevelt National Highway on the north and the Yellowstone Trail on the south. The principal outside markets are Duluth, Minneapolis, and Chicago. At the present time sugar beets are shipped to Billings, Mont., but the building of a sugar factory at Sidney has been announced by the Holly Sugar Co.

The principal towns are Sidney and Fairview, with populations of 1,400 and 700, respectively. Savage, Crane, and Dare are stations on the railroad. The farm population is about 1,600, which is not enough to utilize fully the lands of this project. Montana is known for its good schools, and the Lower Yellowstone project is not backward in this regard. There are 11 school buildings and 10 churches on the project. High schools are located at Sidney and Fairview. Fishing along the Yellowstone River and hunting for grouse and prairie chickens appeal to sportsmen. The mountains in the western part of the State offer attractions for vacations and summer camping trips.

NEBRASKA-WYOMING, NORTH PLATTE PROJECT

THE North Platte project is located in the valley of the North Platte River, in western Nebraska and eastern Wyoming. The irrigable land lies in Goshen County, Wyo., and Scotts Bluff and Morrill Counties in Nebraska, and covers a territory approximately 100 miles long and 25 miles in width at the widest part. The settlement of the valley was begun in the eighties, and since the advent of irrigation, both by private and Government enterprise, has developed rapidly. The altitude varies from 3,800 to 4,500 feet above sea level. The climatic conditions are such as to make the project an agreeable place in which to live. The summers are usually warm and dry. Little extremely warm weather occurs, and then for only short periods. The average rainfall is 14.74 inches, the greater part falling during the growing season. The snowfall is usually light and stays on the ground for short periods. The length of the irrigation season is from April 1 to September 30.

Water for irrigation is obtained by the storage of flood water of the North Platte River in Pathfinder Reservoir, which covers an area of 22,700 acres and has a capacity of 1,070,000 acre-feet at spillway level. The Pathfinder Dam is one of the largest masonry dams in the world, rising 213 feet above its rock foundation. Water is released as required and flows down North Platte River for a distance of 175 miles to Whalen diversion dam, where it is diverted into canals and carried to project lands. The Fort Laramie Canal is 130 miles long and has an initial capacity of 1,440 second-feet. The Interstate Canal has a capacity of 2,200 second-feet. There are 810 miles of canals and laterals on the Interstate division and 519 on the Fort Laramie division. The irrigable area under the Interstate Canal is 115,000 acres and under the Fort Laramie

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Lower Yellowstone diversion dam, Lower Yellowstone project, Mont.-N. Dak.

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The irrigable area of the project is about 59,000 acres, served by the ditches provided. The topography of the district is generally flat with just sufficient fall to facilitate irrigation. Some of the higher areas are rolling. The soil varies from a sandy loam to silt loam; it is fertile, deep, and easily worked. A certain amount of alkali exists in the soil, but can be controlled by drainage.

The principal crops are alfalfa, sugar beets, cereals, corn, and potatoes. The yields of these crops are generally good and range from 20 to 30 bushels of wheat, 2 to 4 tons of alfalfa, 30 to 40 bushels of corn, 3 to 6 tons of potatoes, and 8 to 15 tons of sugar beets. Truck and berries do well. The climate and general conditions are suitable for stock raising and dairying; but, on account

of the long winter seasons, good shelter should be provided. Sheep do especially well, and the fattening of lambs for market on alfalfa, beet tops, and grain is a profitable industry. Cheap forage crops make dairying profitable. Surrounding the project on all sides are large areas of semiarid rolling plains covered with native grasses that support many thousands of sheep and cattle. For the ambitious project farmer this large grazing territory furnishes an opportunity to expand his stock-raising program beyond the capacity of his irrigated farm. Range stock feeding furnishes a market for the hay and grain grown by many settlers.

A branch line of the Northern Pacific Railway runs from Glendive to Sidney and meets a branch line of the Great Northern Railway, thus giving the project a railway throughout its entire length. A well-graded highway runs through the project, connecting with the Roosevelt National Highway on the north and the Yellowstone Trail on the south. The principal outside markets are Duluth, Minneapolis, and Chicago. At the present time sugar beets are shipped to Billings, Mont., but the building of a sugar factory at Sidney has been announced by the Holly Sugar Co.

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NEBRASKA-WYOMING, NORTH PLATTE PROJECT

THE North Platte project is located in the valley of the North Platte River, in western Nebraska and eastern Wyoming. The irrigable land lies in Goshen County, Wyo., and Scotts Bluff and Morrill Counties in Nebraska, and covers a territory approximately 100 miles long and 25 miles in width at the widest part. The settlement of the valley was begun in the eighties, and since the advent of irrigation, both by private and Government enterprise, has developed rapidly. The altitude varies from 3,800 to 4,500 feet above sea level. The climatic conditions are such as to make the project an agreeable place in which to live. The summers are usually warm and dry. Little extremely warm weather occurs, and then for only short periods. The average rainfall is 14.74 inches, the greater part falling during the growing season. The snowfall is usually light and stays on the ground for short periods. The length of the irrigation season is from April 1 to September 30.

Water for irrigation is obtained by the storage of flood water of the North Platte River in Pathfinder Reservoir, which covers an area of 22,700 acres and has a capacity of 1,070,000 acre-feet at spillway level. The Pathfinder Dam is one of the largest masonry dams in the world, rising 218 feet above its rock foundation. Water is released as required and flows down North Platte River for a distance of 175 miles to Whalen diversion dam, where it is diverted into canals and carried to project lands. The Fort Laramie Canal is 130 miles long and has an initial capacity of 1,440 second-feet. The Interstate Canal has a capacity of 2,200 second-feet. There are 810 miles of canals and laterals on the Interstate division and 519 on the Fort Laramie division. The irrigable area under the Interstate Canal is 115,000 acres and under the Fort Laramie

is 107,000 acres. The Northport district contains 15,000 acres of irrigable land. The total irrigable area of the project when completed is estimated to be approximately 237,000 acres.

The topography in general is rolling, with a large percentage of moderately sloping land, some flat, and some very steep areas. The soils vary from light sandy to heavier or gumbo soils. The greater part of the soil is a sandy loam of excellent quality, free from alkali and other injurious substances. It is easily worked and particularly well adapted to the raising of fine potatoes and sugar beets. The soils are very productive and raise large yields of all crops adapted to the climate.

The soil and climate are favorable for the growing of practically any Temperate Zone crop. The principal crops raised are, in the order of the acreage devoted to each, alfalfa, sugar beets, potatoes, oats, corn, wheat, and barley. The large amount of alfalfa produced and the sugar-beet tops, pulp, and sirup



Harvesting wheat, North Platte project, Nebr.-Wyo.

from the sugar factories have made the feeding of cattle and sheep a profitable industry. More than 200,000 sheep and 30,000 head of cattle have been fed in the valley in one season. There is also a growing interest in purebred cattle and hogs. Under existing favorable conditions, the dairy industry offers a good opportunity for settlers. Good herds of both grade and purebred hogs are to be found on the project. Poultry is also a profitable side line.

The project is surrounded by a grass-covered plain devoted to the grazing of stock during the greater part of the year, and furnishing both a supply of feeders and a market for the hay grown on the project.

There are four sugar factories on the project. Beet dumps are conveniently located along the two main railroads and about 40 miles of branch lines. There are two creameries, one at Scottsbluff and one at Mitchell. The Burlington and Union Pacific Railways traverse the project from east to west, the former paralleling the river on the north and the latter on the south side

of the project. The surplus crops and farm products find markets in Casper, Denver, Omaha, Kansas City, Chicago, and other large cities which are accessible through railway transportation. The Lincoln Highway, which runs the full length of the project, and a large mileage of graded county roads make the remotest parts of the project easily and quickly accessible.

The cities and towns to which the project lands are tributary, with their population, are Bridgeport, 1,250; Northport, 80; Bayard, 2,150; Minitare, 660; Scottsbluff, 6,950; Mitchell, 1,300; Morrill, 775; Henry, 130; McGrew, 130; Melbeta, 130; Gering, 2,500; Haig, 50 and Lyman, 300, in Nebraska; and Torrington, 1,300; Lingle, 385; Fort Laramie, 100; Huntley, 50; Yoder, 300; Veteran, 150; and Cottier, 50, in Wyoming. Good educational and social advantages may be enjoyed, such as would not be available in a smaller and less highly developed community. The total population of the district is about 37,000.

NEVADA, NEWLANDS PROJECT

THE Newlands project is located in western Nevada in what is known as the Carson Sink Valley. It is surrounded by mountains on all sides, on the west being timber and snow-clad peaks of the Sierra Nevadas. The general elevation of the project lands is about 4,000 feet above sea level. The temperature ranges from 5° to 105° F. Snow rarely falls, and does not lie on the ground more than a week or two. Owing to the altitude late and early frosts are to be expected, but these ordinarily do not interfere with the great variety of crops which are successfully grown.

The principal engineering features are the control dam at Lake Tahoe, the diversion dam in Truckee River near Derby, the Truckee Canal, the Lahontan Dam and Reservoir, the Carson diversion dam, and a vast network of canals and laterals delivering water to each farm unit in the project. Water for



Jerseys, Newlands project, Nev.

is 107,000 acres. The Northport district contains 15,000 acres of irrigable land. The total irrigable area of the project when completed is estimated to be approximately 237,000 acres.

The topography in general is rolling, with a large percentage of moderately sloping land, some flat, and some very steep areas. The soils vary from light sandy to heavier or gumbo soils. The greater part of the soil is a sandy loam of excellent quality, free from alkali and other injurious substances. It is easily worked and particularly well adapted to the raising of fine potatoes and sugar beets. The soils are very productive and raise large yields of all crops adapted to the climate.

The soil and climate are favorable for the growing of practically any Temperate Zone crop. The principal crops raised are, in the order of the acreage devoted to each, alfalfa, sugar beets, potatoes, oats, corn, wheat, and barley. The large amount of alfalfa produced and the sugar-beet tops, pulp, and sirup



Harvesting wheat, North Platte project, Nebr.-Wyo.

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The project is surrounded by a grass-covered plain devoted to the grazing of stock during the greater part of the year, and furnishing both a supply of feeders and a market for the hay grown on the project.

There are four sugar factories on the project. Beet dumps are conveniently located along the two main railroads and about 40 miles of branch lines. There are two creameries, one at Scottsbluff and one at Mitchell. The Burlington and Union Pacific Railways traverse the project from east to west, the former paralleling the river on the north and the latter on the south side

of the project. The surplus crops and farm products find markets in Casper, Denver, Omaha, Kansas City, Chicago, and other large cities which are accessible through railway transportation. The Lincoln Highway, which runs the full length of the project, and a large mileage of graded county roads make the remotest parts of the project easily and quickly accessible.

The cities and towns to which the project lands are tributary, with their population, are Bridgeport, 1,250; Northport, 80; Bayard, 2,150; Minitare, 660; Scottsbluff, 6,950; Mitchell, 1,300; Morrill, 775; Henry, 130; McGrew, 130; Melbeta, 130; Gering, 2,500; Haig, 50 and Lyman, 300, in Nebraska; and Torrington, 1,300; Lingle, 305; Fort Laramie, 100; Huntley, 50; Yoder, 300; Veteran, 150; and Cottier, 50, in Wyoming. Good educational and social advantages may be enjoyed, such as would not be available in a smaller and less highly developed community. The total population of the district is about 37,000.

NEVADA, NEWLANDS PROJECT

THE Newlands project is located in western Nevada in what is known as the Carson Sink Valley. It is surrounded by mountains on all sides, on the west being timber and snow-clad peaks of the Sierra Nevadas. The general elevation of the project lands is about 4,000 feet above sea level. The temperature ranges from 5° to 105° F. Snow rarely falls, and does not lie on the ground more than a week or two. Owing to the altitude late and early frosts are to be expected, but these ordinarily do not interfere with the great variety of crops which are successfully grown.

The principal engineering features are the control dam at Lake Tahoe, the diversion dam in Truckee River near Derby, the Truckee Canal, the Lahontan Dam and Reservoir, the Carson diversion dam, and a vast network of canals and laterals delivering water to each farm unit in the project. Water for



Jerseys, Newlands project, Nev.

irrigation is obtained from the combined flow of the Truckee and Carson Rivers and from storage in the Lahontan Reservoir. Approximately 70,000 acres are covered by water-right applications, and of this 45,000 acres were irrigated in 1923.

The topography of the district is rolling, but not steep. Light drifting sands, loams, clay, and black peat soils all occur in large quantities. The settler can choose between these, selecting the soil best fitted to the kind of agriculture in which he proposes to engage. The fertility of these soils seems to increase during the first few years of cultivation, as the soil weathers. Alkali is a natural ingredient of all soils of the desert region and is present on some of the lands. To prevent the rise of alkali and consequent damage to crops extensive drainage ditches have been dug.

The principal crop is alfalfa, about which center the cattle, sheep, and hog feeding industries, and which is the basis for the most promising recent growth of the dairying business. Next in importance are wheat, barley, potatoes, sugar beets, and garden truck. Celery and cantaloupes are commercially grown. A wide variety of garden truck and small fruits are also raised. The yield of alfalfa varies with the character of soil and the ability and industry of the farmer. As high as 6 tons or more per acre are frequently produced, but the average is approximately $3\frac{1}{2}$ tons. Wheat and barley will yield from 20 to 40 bushels per acre.

This is an ideal location for stock raising and dairying. The moderate winters, with their freedom from severe storms and light precipitation, make housing facilities inexpensive and insure maximum returns from the feed consumed. Many range cattle and sheep are brought into the project for winter feeding and fattening. Dairying is one of the chief industries. The national forest ranges in the high Sierras to the west furnish excellent summer pasture for range stock at reasonable rentals.

Electricity for project towns is furnished by the Government hydroelectric plant. The main transcontinental line of the Southern Pacific Railroad passes along the northern border of the project and the main line of the Lincoln Highway traverses the project from east to west. The principal markets are found in the mining camps in the vicinity; shipments of baled alfalfa hay, potatoes, grain, and livestock go to California and Utah. Each winter many thousands of head of sheep and cattle are brought into the valley and fattened before being shipped to the San Francisco markets.

The city of Fallon, on the project, has a population of more than 2,000. Other towns are Hazen, Fernley, and Stillwater. At Fallon are three large grammar schools and a high school. Consolidated schools in Fallon serve the surrounding country, busses being used for transportation. Lake Tahoe, of almost world-wide fame, is only a few hours distant by auto or train, and the high Sierras are near by.

NEW MEXICO, CARLSBAD PROJECT

THE Carlsbad project is located in southeast New Mexico in the valley of the Pecos River between the Guadalupe Mountains and the Staked Plains. The project is in Eddy County, of which Carlsbad is the county seat. The elevation of the land is about 3,100 feet above sea level. The yearly temperature ranges from 4° below zero to 112° above. The average annual rainfall for a period of 22 years is 14.41 inches. The maximum rainfall occurs in June, July, and August. Snowfall is light, and rarely stays on the ground more than a few days. The autumn and winter months

are delightful. The summer days are sometimes hot, but the nights are cool. The average growing season is 210 days. The average date of the last killing frost in the spring is April 1, and that of the first killing frost in the fall is October 25.

The main canal is 25 miles long, the last $7\frac{1}{2}$ miles being lined with concrete. Water is delivered to each 40-acre farm. The water supply for the project is furnished by the Pecos River, the winter flow of which is stored in McMillan and Avalon Reservoirs. The area of irrigated land is limited by the amount of water available. Water for domestic and stock use is secured from the irrigation canals.

The irrigable area of the project is 25,000 acres, all of which is in private ownership and nearly all cultivated or irrigated. The topography is smooth, with gentle slopes, and is admirably suited to irrigation. The soils range from light sandy loam to clay loam and contain a high lime content. They are friable and easy to work, and the better types are very fertile.

The climatic and soil conditions on the Carlsbad project are conducive to a wide range of crops. At present cotton and alfalfa predominate. Cereals, corn, and garden truck do well; and fruits, such as apples, pears, peaches, and grapes are grown successfully. Well-farmed land produces from 3 to 6 tons of alfalfa per acre, and from one-half to 1 bale (500 pounds) of cotton. The average gross value of the latter for the five years 1919 to 1923, inclusive, was \$87.75 per acre. Many of the farmers are finding it profitable to feed alfalfa and cottonseed meal to stock, thus realizing a substantial profit for their products. There are several thriving dairies on the project. Hog raising is proving a profitable business. Owing to the mild winters and dry atmosphere, stock of all kinds thrives and can be raised profitably on the project. There are a number of cotton gins and two hydroelectric plants on the project, and a cottonseed crushing plant, located at Loving near the center of the project, assures the farmer a ready market for cottonseed.

The Carlsbad project is surrounded by grazing land that furnishes both summer and winter range for large numbers of cattle and sheep. The national



Thoroughbred Shorthorn cattle, Carlsbad project, N. Mex.

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Thoroughbred Shorthorn cattle, Carlsbad project, N. Mex.

forest reserves in the mountains also furnish summer grazing for a considerable number of cattle.

The Santa Fe Railroad passes through the project, and the State Highway follows the railroad. The small acreage of irrigated land in this section of the country, compared with the large surrounding range territory, insures a good market at home for all hay and grain grown. Carlsbad has a population of 3,000 and is the principal town. Loving and Malaga are also project towns. There are seven grammar schools on the project and a central high school located at Carlsbad.

NEW MEXICO-TEXAS, RIO GRANDE PROJECT

THE Rio Grande project is located in New Mexico and Texas, adjacent to the city of El Paso. It lies in a river valley of rich alluvial soil extending from about 75 miles north to about 50 miles south of El Paso. A healthful and agreeable all-year climate, with an abundance of sunshine, is one of the principal attractions of the project, which is located on the table-lands of the great continental plateau and has an elevation of 3,700 feet. The summer temperature is modified by the low humidity and by frequent summer showers. The winters are short, dry, and open, permitting outdoor work. The average annual rainfall is 10 inches, and the average length of frost-free period is 193 days.

The outstanding engineering feature of the project is the Elephant Butte Dam and Reservoir, described on page 4. A complete system of canals and laterals delivers water to the farms. Extensive and satisfactory drainage has relieved seepage conditions on most of the lands needing it. The water supply for irrigation comes from the Rio Grande. Flood waters are stored by the Elephant Butte Dam and released as required. Domestic water is obtained from shallow wells.

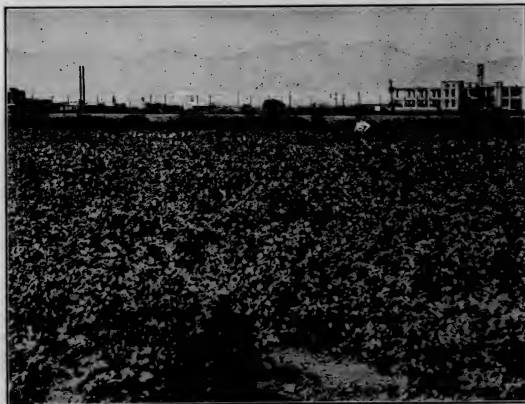
The project comprises about 155,000 acres, exclusive of 25,000 acres in Mexico. The area irrigated at present is about 110,000 acres. The lands are all in private ownership. The surface topography of the Rio Grande Valley is generally flat, and comparatively little leveling is necessary before irrigation can be effected. The soils consist of generally fertile alluvial material laid down by the Rio Grande, ranging from sand to adobe in texture, graded according to the geological conditions under which it was deposited.

The Rio Grande project offers good opportunities to settlers because the soil and climate will grow practically any Temperate Zone crop. Alfalfa has been the standard field crop, of which an average yield of 4 tons per acre can be obtained. It is cut five times in a season. In 1923 cotton yields were large. Cotton leads in acreage and value of crops grown. Melons, fruits, and vegetables are shipped to eastern markets in car lots. Dairying occupies an important place in the agriculture of the district and is found profitable. A mild climate, low rainfall, and the great variety of forage crops make livestock growing attractive. The dry areas adjacent to the project afford some grazing, but cattle and sheep men depend on the irrigated area for feed when grass is short or fattening necessary.

A number of cooperative marketing associations are in operation throughout the project. Growers of poultry, alfalfa, cotton, and melons are well organized. A large number of cotton gins serve the district and a cotton mill is being erected in El Paso. Three creameries operate on the project.

Six main-line railroads enter El Paso. The Atchison, Topeka & Santa Fe Railway serves the Mesilla and Rincon Valleys in New Mexico. The Texas & Pacific and the Southern Pacific Railways combined bisect the El Paso Valley in Texas. The project is therefore well served with railroads to the principal markets. Good roads pass through the project and a number of auto freight lines facilitate the marketing of farm products to El Paso. Several milk routes collect milk and cream daily for the El Paso market. Eastern Texas and the Southern States furnish a market for large quantities of alfalfa hay and meal; melons and small fruits go to interior and eastern markets, and cotton to large centers requiring it. Cotton often brings a premium on account of its fine staple.

The city of El Paso has a population of 90,000. Farm communities near such a city enjoy the unusual combination of the opportunities afforded by new and undeveloped land and the life of a metropolis. Las Cruces has a population of 5,000. There are 38 towns and railroad stations on the project outside of El Paso and Las Cruces. The most important of these are Canutillo, Ysleta, Clinton, and Fabens, in Texas; and Hot Springs, Hatch, Rincon, and La Mesa, in New Mexico. There are 28 rural schools in Rincon and Mesilla Valleys and 12 in El Paso Valley. Las Cruces has a good high school and a convent. The New Mexico State College of Agriculture and Mechanic Arts and the Agricultural Experiment Station are located near Mesilla Park. In addition to these, El Paso offers excellent educational advantages. Cloudcroft, in the Sacramento Mountains to the north, with an elevation of about 8,000 feet and reached by the El Paso & Southwestern Railway, furnishes an attractive summer resort where fishing and hunting may be enjoyed. El Paso is a city of historic and natural beauty.



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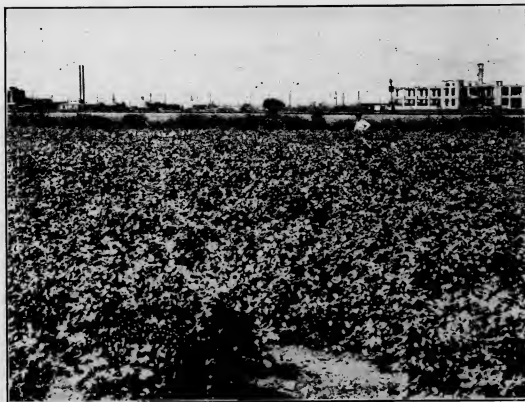
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OREGON, UMATILLA PROJECT

THE Umatilla project, situated in northeastern Oregon, comprises two main divisions. The older, or eastern division, of 17,000 acres, lies east of the Umatilla River, and the western division, of 11,300 acres, extends from the mouth of the Umatilla River westerly along the Columbia River for about 20 miles. The climate is comparatively dry, with an average rainfall of 9 inches. The temperature during the summer months is frequently high, but the heat is not oppressive and the nights are cool. The winters are not severe. The altitude is 470 feet above sea level and the average frost-free period is 168 days.



Irrigating young alfalfa, Umatilla project, Oreg.

The water supply for all of this district is the Umatilla River, with a mean annual run-off of 520,000 acre-feet. Cold Springs and McKay Dams constitute the most important engineering features. These reservoirs have a combined capacity of 104,000 acre-feet, and when the latter is completed will furnish ample water for all project lands and a supplemental supply for 28,000 acres of privately owned land. All main canals and most of the laterals are concrete lined. The topography of the district is rolling and the surface is uneven and requires leveling to facilitate irrigation. The soil is sandy loam, reasonably fertile, free from alkali, and requires careful handling to prevent blowing.

The land is adapted to the growing of alfalfa, small fruits, corn, potatoes, and garden truck. The average yield per acre of alfalfa is about 4 tons. Three crops are usually harvested, and yields of 6 tons per acre are not uncommon. Corn and silage for stock feed, and potatoes, both early and late varieties, give good returns. The mild and dry climate of eastern Oregon is favorable for the production of livestock and poultry. Sheep feeding on the project is a profitable business, and dairying is carried on extensively. Excellent summer range for cattle and sheep is furnished by the surrounding dry lands and by the national forest reserve areas which are leased at low rates to stockmen.

The entire length of the project is traversed by the Oregon-Washington Railway & Navigation Co. railway and the Columbia Highway. Good roads lead to these main arteries of traffic, making markets for produce easily accessible. Portland, Oreg., is the principal market for grain, small fruits, truck, dairy products, and fat livestock. Local demand and the surrounding country consume a considerable amount of the produce grown on the project.

Hermiston, Umatilla, Irrigon, and Boardman are project towns. Hermiston is the largest, with a population of about 600. There are six schools on the project and free motor busses take children to and from school. Most of the religious denominations are represented and have buildings that serve as social centers. The Columbia Highway makes pleasure resorts easily accessible. Following this highway east, a few hours' drive takes one into the Blue Mountains, where a well-timbered country affords good fishing and hunting. Westward the highway runs along the Columbia River through unsurpassed scenery to Portland, Oreg.

OREGON-CALIFORNIA, KLAMATH PROJECT

THE Klamath project is located in southern Oregon and northern California at the foot of the Cascade Mountains. Klamath and Lost Rivers, with the storage provided by Clear Lake, Gerber Reservoir, and Upper Klamath Lake, furnish an ample water supply for the irrigated land. Klamath is noted for its equable climate, being both healthful and invigorating. The growing season is short, but the days are long and growth is rapid. Frosts are to be expected until early in June and frequently occur in September. The average annual precipitation is 12.8 inches. The elevation of the irrigable lands ranges from about 4,000 to 4,300 feet above sea level.

The principal engineering features of the project are the tunnel which carries the main canal through the hill in the city of Klamath Falls for a distance of 3,300 feet; the Lost River diversion dam; Clear Lake and Gerber



Haystacks on stock ranch, Klamath project, Oreg.-Calif.

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Haystacks on stock ranch, Klamath project, Oreg.-Calif.

storage dams; Link River diversion dam; and the 4,300-foot concrete flume on Canal C. The irrigable area of the project as now developed is 60,000 acres, but when complete will be 140,000 acres or more. The topography of the lands is generally smooth with gentle slopes, and preparation for irrigation is relatively inexpensive. The surrounding country just outside of the project is rough and mountainous. The soils are of basaltic origin, fertile, easily worked, and do not contain high percentages of alkali.

On account of the cool climate small grains, forage crops, and hardy vegetables are produced. Two crops of alfalfa are grown, which yield from 2 to 4 tons per acre, with additional fall pasture. Wheat yields from 20 to 40 bushels and barley from 30 to 60 bushels per acre. The large area of cheap range land and the inland nature of the country combine to make of the Klamath district preeminently a stock and dairy country. Very little loss occurs from stock diseases, and the proximity of immense forests and saw-mills insures comparatively cheap lumber for barns and stock sheds. The open ranges, together with the national forest reserves in this section of the State, give opportunity for farmers to maintain more stock than their farms normally will support, or to purchase stock for feeding at reasonable prices. Dairying is a profitable business and well suited to the district. There are three creameries and one cheese factory on the project. A farm bureau exchange does cooperative buying. Various organizations, such as potato growers, poultry growers, cow-testing associations, and a cream-producers' pool, have been formed.

Klamath Falls is now on a branch line of the Southern Pacific, but when construction of the Natron cut-off is completed it will be on the main line from Portland to San Francisco. It is expected that this line will be completed and in operation during 1926. It has a length at present of 40 miles. The project is traversed by good highways. The principal outside markets are Portland, Sacramento, and San Francisco. Much of the produce grown on the project finds a market in Klamath Falls and the near-by lumber camps.

Klamath Falls, Merrill, Malin, and Bonanza are project towns, the former being the principal city in southern Oregon east of the Cascades. It has a population of approximately 7,000 and is the distributing center for a large territory. Educational facilities are good, with 21 grade and five high schools. There are nine churches in Klamath Falls and four on the project outside the city limits. Upper Klamath Lake and its tributary mountain streams make an attractive summer resort, with excellent boating and fishing. Lake of the Woods, Diamond Lake, Spring Creek, and Medicine Lake are popular resorts during the summer months. The nationally famed Crater Lake is 65 miles from Klamath Falls. Tule Lake is frequented during the fall and winter by large numbers of ducks and geese. Deer are quite plentiful in the timbered areas surrounding the project.

SOUTH DAKOTA, BELLE FOURCHE PROJECT

THE Belle Fourche project is in the western part of South Dakota. The climate of this region is semiarid, with an average annual rainfall of 15 inches. The altitude is approximately 2,800 feet above sea level. The frost-free season averages about 130 days. Maximum summer temperatures seldom reach 100° F., but the long days of abundant sunshine during June, July, and August favor plant growth. Winter weather is generally mild, but is subject to sudden changes.

The water supply for the project is furnished by the Belle Fourche River, the flow of which is diverted through a 1,400 second-foot capacity canal into the Belle Fourche Reservoir. The capacity of the reservoir is adequate for all of the lands served. As now constructed, the irrigation system will deliver water to about 82,000 acres of land.

The surface topography of project lands is smooth but rolling, rendering expensive leveling unnecessary. Irrigation is effected by means of contour ditches and flooding. The predominating soil type is Pierre clay, locally known as gumbo, which comprises about two-thirds of the project area. This class of soil is very productive when properly farmed. The sandy loam types are more easily worked than the heavier soils, but no more productive.



Threshing wheat, Belle Fourche project, S. Dak.

The principal crops are alfalfa, corn, oats, and sugar beets. About 30,000 acres, or nearly one-half of the cropped area of the project, is in alfalfa. The yield averages about 2 tons per acre from three cuttings. Small grains yield well under favorable conditions, but should be rotated with corn, sugar beets, or other intensively cultivated crops. With an abundance of feed at very reasonable cost, the opportunities for livestock and dairy farming are exceptionally favorable and provide means for marketing bulk crops in concentrated form. Alfalfa sold on the project at \$8 per ton brought \$24 in Wisconsin, which shows the need and profit to be derived from local consumption. The sheep industry has grown rapidly in recent years. Wide expanses of open prairie lie to the north and east of the project, conveniently located for summer range, where project sheepmen pasture their flocks at very reasonable cost.

Sugar beets are shipped to Scottsbluff, Nebr., but cream is manufactured into butter locally and wheat is often sold to local millers. Railroad transportation is provided by the Chicago & North Western Railway, the Chicago, Milwaukee & St. Paul, and the Burlington. Together these lines give a ready outlet to Omaha, Sioux City, Lincoln, Minneapolis, Denver, Billings, and the Northwest. The Short Cut Highway, running from Minneapolis to the Yel-

storage dams; Link River diversion dam; and the 4,300-foot concrete flume on Canal C. The irrigable area of the project as now developed is 60,000 acres, but when complete will be 140,000 acres or more. The topography of the lands is generally smooth with gentle slopes, and preparation for irrigation is relatively inexpensive. The surrounding country just outside of the project is rough and mountainous. The soils are of basaltic origin, fertile, easily worked, and do not contain high percentages of alkali.

On account of the cool climate small grains, forage crops, and hardy vegetables are produced. Two crops of alfalfa are grown, which yield from 2 to 4 tons per acre, with additional fall pasture. Wheat yields from 20 to 40 bushels and barley from 30 to 60 bushels per acre. The large area of cheap range land and the inland nature of the country combine to make of the Klamath district preeminently a stock and dairy country. Very little loss occurs from stock diseases, and the proximity of immense forests and sawmills insures comparatively cheap lumber for barns and stock sheds. The open ranges, together with the national forest reserves in this section of the State, give opportunity for farmers to maintain more stock than their farms normally will support, or to purchase stock for feeding at reasonable prices. Dairying is a profitable business and well suited to the district. There are three creameries and one cheese factory on the project. A farm bureau exchange does cooperative buying. Various organizations, such as potato growers, poultry growers, cow-testing associations, and a cream-producers' pool, have been formed.

Klamath Falls is now on a branch line of the Southern Pacific, but when construction of the Natron cut-off is completed it will be on the main line from Portland to San Francisco. It is expected that this line will be completed and in operation during 1926. It has a length at present of 40 miles. The project is traversed by good highways. The principal outside markets are Portland, Sacramento, and San Francisco. Much of the produce grown on the project finds a market in Klamath Falls and the near-by lumber camps.

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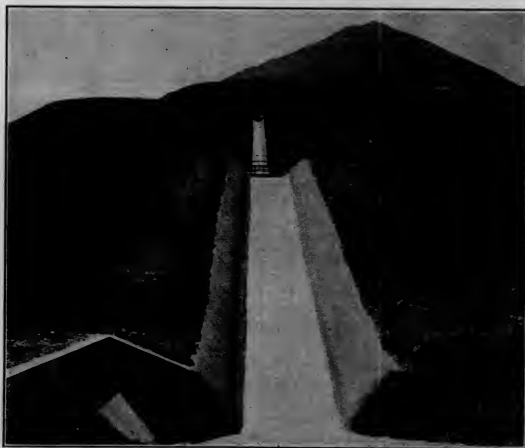
lowstone Park and traversing the project from east to west, and the Black and Yellow Trail and Custer Battlefield Highway, skirting the Black Hills on the north, furnish convenient thoroughfares for motor traffic and those seeking recreation.

Newell has a population of 400 and is the principal town, as well as project headquarters. Nisland, Fruitdale, and Vale are towns on the project. Belle Fourche, the county seat, has a population of about 2,000. The rural population on the project in 1923 was 2,000, and double that number could be supported. Newell has a new high school, and there are three similar institutions on the project. Grammar schools are ample for the needs of the communities. The Belle Fourche project offers adequate recreational advantages, with good roads leading to the Black Hills and other points of historic interest and scenic beauty.

UTAH, STRAWBERRY VALLEY PROJECT

THE Strawberry Valley project is situated in the north central portion of Utah along the southeastern shore of Utah Lake. The elevation of the project lands is about 4,600 feet above sea level, and the average rainfall is 18½ inches, most of which occurs from September 1 to May 1. The climate is temperate, varying from 95° F. in summer to 0° F. in winter. The frost-free period averages 140 days.

Water for irrigation is obtained from the Strawberry and Spanish Fork Rivers and from smaller streams. The flood flow is stored in Strawberry Reservoir, carried through Strawberry Tunnel approximately 4 miles into Diamond Fork, and then diverted to the canal systems. The irrigation system



Spillway, Strawberry Valley power house, Strawberry Valley project, Utah.

serves a dual purpose in furnishing a full supply of water for about 20,000 acres, as well as a late supply for about 35,000 acres which previously were supplied inadequately during the months of July, August, and September. The irrigable lands are rolling, and care must be taken for the best results in irrigation. The soil varies from sandy loam to heavy clay and to black alluvium. All soils are easily worked and extremely fertile.

The crops grown are wheat, oats, barley, millet, alfalfa, timothy, sugar beets, potatoes, corn, cane, apples, plums, pears, peaches, prunes, apricots, cherries, melons, and all kinds of vegetables. The sugar beet, cereal, and hay crops constitute the staple crops under the project. Three sugar factories are located on the project. Dairying is extensively engaged in and is one of the most profitable and satisfactory enterprises of the district. The adjacent mountains and forest reserves form an excellent summer range for cattle and sheep, and the great deserts on the west are used for winter range. Bituminous coal is extensively mined in Carbon County, about 100 miles east of the project. Electrical energy from the Reclamation Bureau power house is available in all the project towns.

The project is traversed by two transcontinental railroad lines, the Denver & Rio Grande Western and the Los Angeles & Salt Lake (Union Pacific system). There is also a local electric interurban line connecting the main project towns with Salt Lake City and points in northern Utah. Excellent hard-surfaced roads connect the main project towns with Provo and Salt Lake City. Branch roads to the sugar factories, connecting with the main highways, have been hard surfaced, providing good transportation for this product. Cooperative marketing associations are organized for the packing and sale of many products. Salt Lake City, Ogden, and smaller towns, and the mining districts constitute the principal markets for most of the products.

Provo, the county seat of Utah County, has a population of about 13,000, and is located about 5 miles north of the project. There are 12 towns in the district, with an aggregate population of about 15,000. Excellent schools and educational facilities are provided in all project towns. At Provo is located the Brigham Young University, at Salt Lake City the University of Utah, and at Logan the State Agricultural College. Excellent recreational advantages are offered at Salt Lake City and the mountain districts, which may be reached in a few hours by automobile.

WASHINGTON, OKANOGAN PROJECT

THE Okanogan project is located in north central Washington, on the west side of the Okanogan River and about 50 miles south of the Canadian line, in the vicinity of Okanogan, Wash. The elevation of the project lands is about 1,000 feet above sea level. The temperature ranges between -10° and 108° F. The summers are hot and dry, but the heat is seldom oppressive, and the nights are cool. Early and late frosts seldom interfere with the growth of crops.

The principal engineering features are the Conconully Reservoir, the Salmon Lake Reservoir, the diversion weir and headworks, and the Robinson Flat pumping plant, from which the water supply for irrigation is derived. The canal system, which is nearly all concrete lined, delivers water to each farm unit. Wells can be obtained on a large part of the project for domestic water supply and irrigation. Electricity is available for pumping and domestic uses.

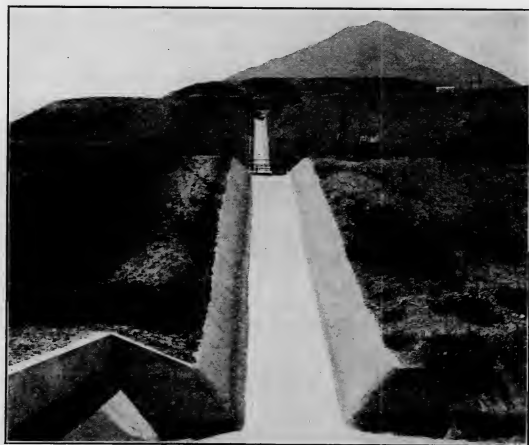
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The project embraces a total of about 7,650 acres. The lands are somewhat broken and the depth of soil will not permit much leveling, thus requiring an extensive system of farm laterals. The outlying districts are rough and mountainous. The soil is volcanic ash combined with a varying quantity of sand underlaid with sand and gravel, which affords excellent underdrainage and precludes the probability of seeped areas.

Nearly all the crops of the Temperate Zone can be grown here, but apples and alfalfa predominate. Nearly all the land irrigated to date is planted to apple orchards. Soft fruits, berries, and garden truck can also be grown profitably. The average yield of apples for the last three years was 263 boxes per acre. The average yield of alfalfa is about $2\frac{1}{2}$ tons per acre. There are several warehouses on the project through which apples are shipped and supplies handled for the benefit of farmers. There are also two sawmills and two box factories.

A branch line of the Great Northern Railway, passing along the eastern border of the project, gives good passenger and freight service and connects with the main line at Wenatchee, Wash., about 100 miles south. A State and Federal aid hard-surfaced highway runs through the edge of the district, and hard-surfaced roads penetrate to all parts of the project. All crops, with the exception of fruit, which is marketed all over the United States, are fed and marketed at home.

Okanogan is the principal town and county seat of Okanogan County and is located near the southern extremity of the project. It has a population of 1,250. Omak and Riverside are smaller towns that serve the project. School facilities are excellent. Okanogan and Omak have grammar and high schools. Children are transported in busses to the central consolidated schools, where better facilities are available than in small country schools. Many of the religious denominations are represented in the towns. There are many places of interest within an hour's ride of the project where fishing and hunting may be enjoyed in the shady forests. For those who care to spend a week or more on an outing, the high mountains to the west are especially inviting.



Ranch home, Okanogan project, Wash.

WASHINGTON, YAKIMA PROJECT

THE Yakima project is located in south central Washington, in the valley of the Yakima River on the eastern slope of the Cascade Mountains. It is made up of seven natural divisions, of which the Tieton, of 32,000 acres, and the Sunnyside, of 107,600 acres, have been constructed. The Wapato division, containing 120,000 acres on the Yakima Indian Reservation, is being constructed by the Bureau of Indian Affairs. The total area in the valley that may eventually be irrigated is about 600,000 acres.

The climate is mild, with little precipitation but with occasional cold snaps. The summers are warm, with a frost-free season of about 150 days. The annual rainfall varies from 6 to 8 inches. The elevation of the irrigable area ranges from 700 feet above sea level on the Sunnyside division to 2,100 feet on the Tieton division.

The principal engineering features already constructed comprise the four storage reservoirs—Kachess, Keechelus, Cle Elum, and Rimrock—and the Sunnyside and Tieton canal systems. The irrigated lands receive their water supply from the Yakima River and its tributaries, which rise in the snow-covered mountains of the Cascade Range.



Corn field, Yakima project, Wash.

The soils of both the Sunnyside and Tieton divisions are generally of a fine, silty texture, locally known as volcanic ash. They are deep, fertile, easily tilled, and well adapted to almost all Temperate Zone crops. The character of the topography is generally rolling and irrigation is carried on mainly by the furrow system. Fruits, more particularly apples, and alfalfa are the principal products. Wheat, corn, vegetables, potatoes, and berries are also important crops. Alfalfa produces from 3 to 6 tons per acre.

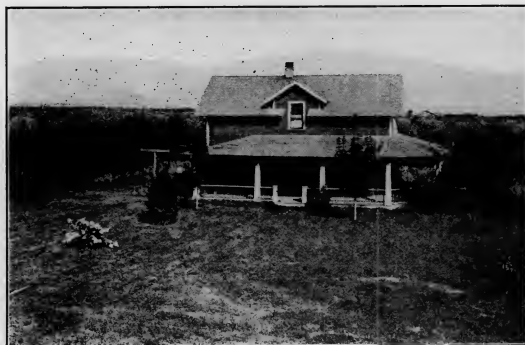
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The project has three beet-sugar factories, two vinegar factories, two dried-fruit factories, and a canning factory, besides a number of creameries and a cheese factory. Cold-storage facilities are afforded by plants having a combined capacity of more than 2,000,000 boxes of apples.

The main line of the Northern Pacific Railroad passes through the project, and the Union Pacific connects Kennewick and Yakima. Shipping stations are only a few miles distant from the individual farms. A paved State highway extends 45 miles down the valley from Yakima through the Sunnyside division, and an excellent gravel highway runs to Ellensburg, connecting this project with the National Parks Highway, which extends to Seattle. The market for the extensive fruit crop is furnished mainly by the large cities in the interior and the East; the Pacific coast cities provide an outlet for the surplus forage, grain crops, and livestock.

Yakima is the business center and principal city in the Yakima Valley and has a population of about 22,000. There are 18 smaller towns on the project with a combined population of 8,000, and the farming population is about 14,000. Exclusive of the city of Yakima there are 51 schools on the project, including 6 consolidated schools and 6 accredited high schools. The Yakima Valley is only a few hours' ride from the most picturesque sections of the Cascades, and Mount Rainier or Mount Adams, with their glaciers and perpetual snow, may be reached with less than a day's drive.

WYOMING, RIVERTON PROJECT

THE Riverton project, now under construction, will irrigate a tract of land in excess of 100,000 acres lying north of Wind River and west of the Big Horn River. Storage will be provided at Bull Lake and Pilot Butte Reservoirs. The total capacity of these reservoirs will not be less than 145,000 acre-feet. The construction of the Pilot Butte Reservoir has been begun, and it will probably be completed in 1925.

The soil ranges from a sandy loam to a clay loam, and is generally heavy. Soil and climatic conditions are well suited for the production of alfalfa, cereals, potatoes, sugar beets, and hardy vegetables.



Wind River diversion dam under construction, Riverton project, Wyo.

The waters of Wind River are diverted into the Wyoming Canal at a point about 35 miles above Riverton by a concrete structure known as the Wind River diversion dam. This dam was completed in 1923. About 11 miles of the Wyoming Canal have been completed. The first 9 miles have a capacity of 2,200 second-feet. A hydroelectric power plant with an initial capacity of 1,200 horsepower and a possible ultimate capacity of 2,400 horsepower has been built 9 miles below the headworks. Power from this plant will be used in the completion of the project, especially for canal and drainage excavation. Surplus energy will be available for sale to settlers. The excavation of the lateral system to supply 1,600 acres of land above the reservoir has been completed, and water will be available for this tract in 1925. Lateral excavation is in progress between the reservoir and Pavillion.

In 1925 it is planned to complete the Pilot Butte Reservoir, excavate the Wyoming Canal to Five Mile Creek, and complete a portion of the lateral system under this canal. The excavation of the Pilot Canal below the Pilot Butte Reservoir will also probably be begun.

The public lands have not been opened to homestead entry, but a portion, comprising the first unit, will no doubt be available during 1925.

WYOMING, SHOSHONE PROJECT

THE Shoshone project is located in the northwestern portion of Wyoming, near the Yellowstone National Park. Springs are cool and the summers warm and clear. The maximum recorded temperature is 101° and the minimum -34° F. The frost-free season extends from about May 23 to September 19. The average rainfall is 5½ inches, and the average elevation is 4,500 feet above sea level.

There are many interesting engineering features on this project, among which are the Shoshone Dam, a rubble concrete arch 328 feet high placed across the Shoshone River about 8 miles above Cody, Wyo., that makes a lake 10 square miles in area and provides 456,600 acre-feet of storage; the Corbett diversion dam; the Corbett Tunnel; the Willwood diversion dam, 68 feet high; a \$250,000 power plant at Shoshone Dam; and a very complete canal and lateral system now constructed covering 71,000 acres, and an extension, nearing completion, for 17,600 acres additional.

With a mean annual flow of 1,097,000 acre-feet, the river furnishes an ample water supply. Water for domestic use is obtained in some districts from shallow wells and in others from the canals. The topography of the land, in general, is suitable for irrigation without prohibitive leveling costs. The soils of the project are varied, some sections having clay soil with a subsoil of coarse gravel; others are predominately of the sandy loam type.

The four principal crops are alfalfa, sugar beets, potatoes, and wheat. Alfalfa has been the main crop since the inception of the project. The average yield is about two tons per acre, although many fields produce double that amount. Sugar-beet production is increasing rapidly and is probably the most profitable line of farming at the present time. Small fruits, berries, and truck do well and are grown principally for local consumption. The climate and compact settlement of the project are favorable for dairying and poultry raising, and many of the successful farmers have these industries as the backbone of their farming operations. Turkeys also do exceptionally well on account of the dry climate, and represent an important part of the farmer's program. Feeder hogs are extensively raised and thousands of lambs are fattened on the project for market every year. The timber-covered mountains

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Yakima is the business center and principal city in the Yakima Valley and has a population of about 22,000. There are 18 smaller towns on the project with a combined population of 8,000, and the farming population is about 14,000. Exclusive of the city of Yakima there are 51 schools on the project, including 6 consolidated schools and 6 accredited high schools. The Yakima Valley is only a few hours' ride from the most picturesque sections of the Cascades, and Mount Rainier or Mount Adams, with their glaciers and perpetual snow, may be reached with less than a day's drive.

WYOMING, RIVERTON PROJECT

THE Riverton project, now under construction, will irrigate a tract of land in excess of 100,000 acres lying north of Wind River and west of the Big Horn River. Storage will be provided at Bull Lake and Pilot Butte Reservoirs. The total capacity of these reservoirs will not be less than 145,000 acre-feet. The construction of the Pilot Butte Reservoir has been begun, and it will probably be completed in 1925.

The soil ranges from a sandy loam to a clay loam, and is generally heavy. Soil and climatic conditions are well suited for the production of alfalfa, cereals, potatoes, sugar beets, and hardy vegetables.



Wind River diversion dam under construction, Riverton project, Wyo.

The waters of Wind River are diverted into the Wyoming Canal at a point about 35 miles above Riverton by a concrete structure known as the Wind River diversion dam. This dam was completed in 1923. About 11 miles of the Wyoming Canal have been completed. The first 9 miles have a capacity of 2,200 second-feet. A hydroelectric power plant with an initial capacity of 1,200 horsepower and a possible ultimate capacity of 2,400 horsepower has been built 9 miles below the headworks. Power from this plant will be used in the completion of the project, especially for canal and drainage excavation. Surplus energy will be available for sale to settlers. The excavation of the lateral system to supply 1,600 acres of land above the reservoir has been completed, and water will be available for this tract in 1925. Lateral excavation is in progress between the reservoir and Pavilion.

In 1925 it is planned to complete the Pilot Butte Reservoir, excavate the Wyoming Canal to Five Mile Creek, and complete a portion of the lateral system under this canal. The excavation of the Pilot Canal below the Pilot Butte Reservoir will also probably be begun.

The public lands have not been opened to homestead entry, but a portion, comprising the first unit, will no doubt be available during 1925.

WYOMING, SHOSHONE PROJECT

THE Shoshone project is located in the northwestern portion of Wyoming, near the Yellowstone National Park. Springs are cool and the summers warm and clear. The maximum recorded temperature is 101° and the minimum -34° F. The frost-free season extends from about May 28 to September 19. The average rainfall is 5½ inches, and the average elevation is 4,500 feet above sea level.

There are many interesting engineering features on this project, among which are the Shoshone Dam, a rubble concrete arch 328 feet high placed across the Shoshone River about 8 miles above Cody, Wyo., that makes a lake 10 square miles in area and provides 456,000 acre-feet of storage; the Corbett diversion dam; the Corbett Tunnel; the Willwood diversion dam, 68 feet high; a \$250,000 power plant at Shoshone Dam; and a very complete canal and lateral system now constructed covering 71,000 acres, and an extension, nearing completion, for 17,600 acres additional.

With a mean annual flow of 1,007,000 acre-feet, the river furnishes an ample water supply. Water for domestic use is obtained in some districts from shallow wells and in others from the canals. The topography of the land, in general, is suitable for irrigation without prohibitive levelling costs. The soils of the project are varied, some sections having clay soil with a subsoil of coarse gravel; others are predominately of the sandy loam type.

The four principal crops are alfalfa, sugar beets, potatoes, and wheat. Alfalfa has been the main crop since the inception of the project. The average yield is about two tons per acre, although many fields produce double that amount. Sugar-beet production is increasing rapidly and is probably the most profitable line of farming at the present time. Small fruits, berries, and truck do well and are grown principally for local consumption. The climate and compact settlement of the project are favorable for dairying and poultry raising, and many of the successful farmers have these industries as the backbone of their farming operations. Turkeys also do exceptionally well on account of the dry climate, and represent an important part of the farmer's program. Feeder hogs are extensively raised and thousands of lambs are fattened on the project for market every year. The timber-covered mountains

produce an abundance of summer pasture for range stock, which affords a market for surplus feed grown under irrigation.

The main line of the Chicago, Burlington & Quincy Railroad runs through the eastern part of the Frannie division, and a spur from the main line runs through the heart of the project to Cody, Wyo. The Park to Park Highway passes through Powell and Cody, giving a direct route to the Yellowstone National Park. The principal markets for wheat and fat livestock are Kansas City and Omaha. The local demand consumes most of the forage and dairy products.

Powell, with a population of 1,300, is the principal town, and Deaver and Frannie are smaller railway stations. Billings, Mont., is the nearest city of much importance. Consolidated schools exist at Deaver and Powell, and serve nearly all the project and some of the adjacent communities. Powell has an accredited high school with a Smith-Hughes course in agriculture. There are 11 fraternal organizations, 17 social, and 8 churches on the Garland division. On the Frannie division there are 4 fraternal, 3 social, and 2 church organizations. The Yellowstone National Park is a half day's drive from Powell. Many other interesting places can be reached over good roads by those seeking recreation.



Hampshire hogs, Shoshone project, Wyo.

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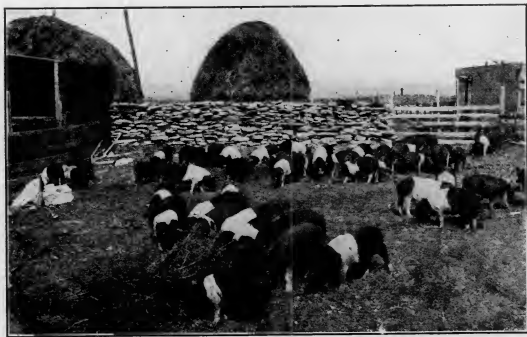


Sheep are used to keep the growth of grass and weeds from the canal banks

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Hampshire hogs, Shoshone project, Wyo.



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